VOL. XXIX. CLEVELAND, O., APRIL 14, 1904. No. 15.

NINE MONTHS' SHIPBUILDING IN UNITED STATES.

The bureau of navigation reports 177 sail and steam vessels of 55,066 gross tons built in the United States and officially numbered during the quarter ended March 31, 1904, as follows:

	Wood.				Steel		Total.	
	Sail.		Steam.		Steam			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf	52	11,858	48	1,797	7	17,874	107	31,529
Porto Rico	1	22					1	22
Pacific	7	2,296	19	2,247	1	374	27	4,917
Hawaii								
Great Lakes			3	59	4	16,744	7	16,803
Western Rivers			34	1,754	1	41	35	1,795
Total	60	14,176	104	5,857	13	35,033	177	55,066

During the corresponding quarter ended March 31, 1903, 187 sail and steam vessels of 58,588 gross tons were built in the United States and officially numbered, as follows:

	Wood.				Steel.		Total.	
	Sail.		Steam.		Steam.			
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf	65	7,715	50	3,093	11	15,382	126	26,190
Porto Rico	3	23					3	23
Pacific	5	3,084	16	957	3	8,935	24	12,976
Hawaii			1	9			1	9
Great Lakes			3	95	5	17,398	8	17,493
Western Rivers			24	1,809	1	88	25	1,897
Total	73	10,822	94	5,963	20	41,803	187	58,588

Total built, nine months ended March 31, 1904, 232,133 gross tons.

Total built, nine months ended March 31, 1903, 230,187 gross tons.

FAVOR SUBMARINES OF PROTECTOR TYPE.

A report has been received at the war department from a board of artillery officers, composed of Major Arthur Murray, Capt. C. J. Bailey, and Capt. C. F. Parker, in regard to the recent test of the submarine boat Protector at Fort Adams, Mass. The report has been referred to the general staff for consideration. The board recommends, in consequence of its conclusions, that five of these boats be purchased for use in submarine defence, as follows: One for the school of submarine defence, for experimental work; one for the eastern entrance of Long Island sound, one for the entrance to Chesapeake bay, one for San Francisco harbor and one for Puget sound. The report says:

"The board believes that this type of submarine boat is a most valuable auxiliary to the fixed mine defence, and in cases where channels cannot be mined owing to depth, rough water, swift tides or width of channels, it will give the nearest approach to absolute protection now known to the board. The boat can lie for an indefinite time adjacent to the point to be defended in either cruising, awash or submerged condition, by its anchors or on the bottom ready for instant use, and practically independent of the state of the water and in telephonic connection with the shore, or can patrol a mined or unmined channel invisible to the enemy and able to discharge its torpedoes at all times. In narrow channels the boat or boats would have a fixed position with a telephone cable buoyed or anchored at the bottom. In wide channels they would patrol or lie in mid-channel or where they could readily meet approaching vessels. With picket or scout boat, outside the mine field, or even at extreme range of gun fire, telephone communication can be sustained and information received and instructions sent for attacking approaching vessels.

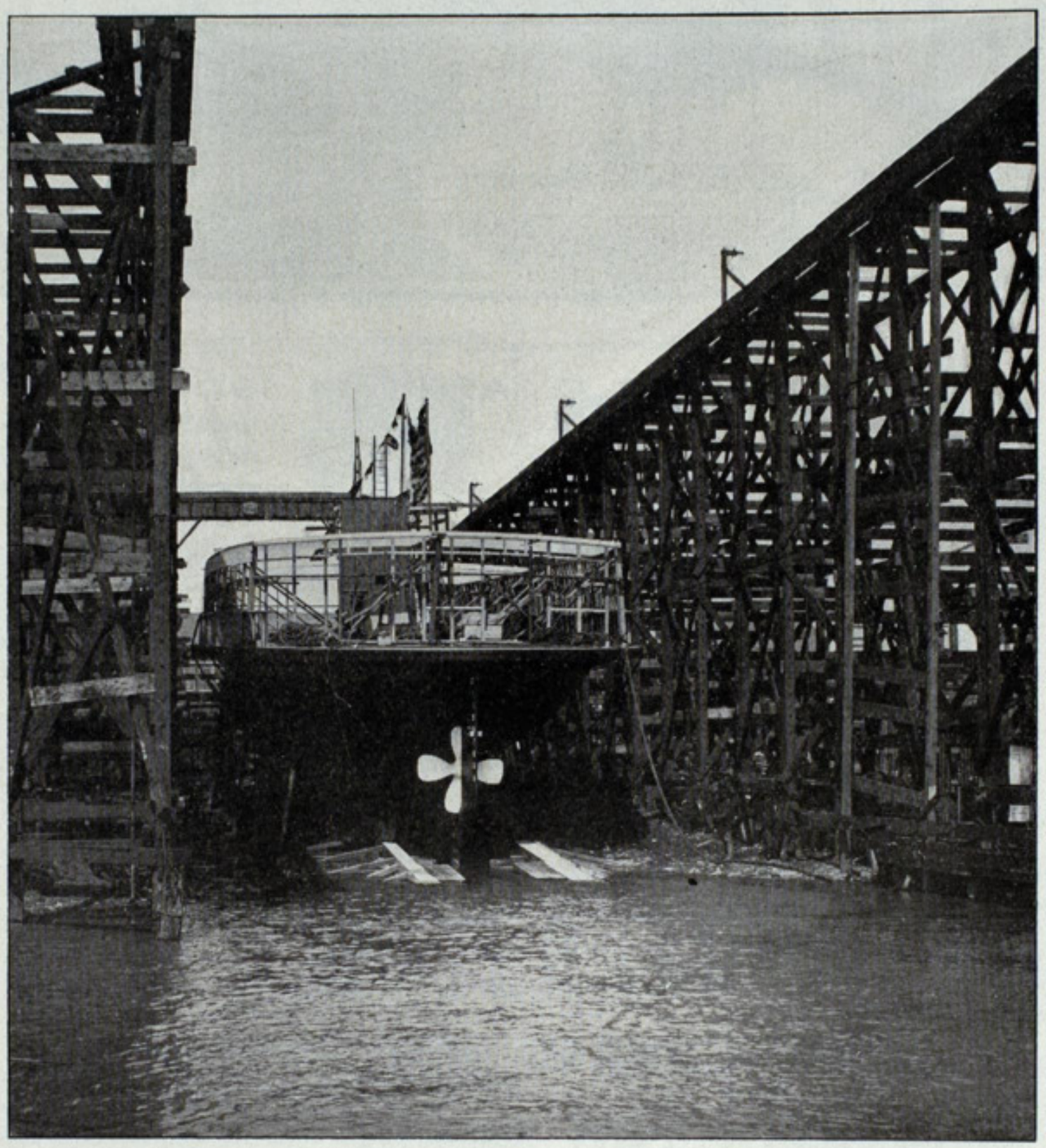
"For an attack the boat shows great superiority over any existing means of attacking mine fields known to the board. It can run by any field, as installed at present, with but little or no danger from the explosion of any particular mine or from gun fire during the few seconds it exposes the sighting hood for observations and can attack at its pleasure vessels in the harbor. The board personally witnessed the ease with which cables can be grappled, raised and cut. While the boat is maneuvering on the bottom mine cables can be swept for, found and cut, or a diver can be sent out for that purpose. The board recommends consideration of the foregoing by the general staff.

"The question of the use of the Whitehead torpedoes as part of the fixed mine defence, fired from tubes on shore, is now receiving consideration. Where channels are wide and water is swift this use of the Whitehead will be very limited. With boats of this type the Whitehead can, it is believed, be carried within certain effective range in all ordinary channels, and this alone will warrant the consideration asked for."

Secretary Moody of the navy department has made public the findings of the court of inquiry charged with investigating the collision between the battleships Illinois and Missouri off Guantanamo, March 2. The court finds that the collision was primarily due to the breaking of the Missouri's steering gear. The court recommends that no further proceedings be taken, and Capt. Bradford of the Illinois is highly commended on the manner in which he handled the ship in the emergency.

LIVERPOOL SHIPPING LETTER.

Liverpool, April 2.—The shareholders of the Cunard Steamship Co., considering the keen competition and depression in shipping generally, should feel highly gratified with the report issued by the directors this week. And on the whole, those who have a monetary interest in the concern do speak in the highest terms of praise of the manner in which the affairs of the undertaking are being managed. The accounts which have been duly certified by the auditors, and which include £4,807.13.7 brought forward from 1902, show that the profits amount to £271,-966.14.1. After debiting income tax and reserving £164,747.19.1 for depreciation of ships and wharf properties, and transferring £30,-302.16.1 to the company's insurance fund, there remains at the credit of profit and loss accounts £69,-578.15.9, out of which the directors recommend the payment of a dividend at the rate of 4 per cent per annum, free of income tax, on the paid up capital of the company, payable on and after April 16. and carrying forward the balance of £5,577.-19.9 to the credit of profit and loss account, 1904. The balance at the credit of the insurance fund has been increased from £357,000 to £380,-000. Outward freights during 1903 show an improvement on 1902, but cargoes home were small in quantity, and rates low during the whole year. The passenger business exhibited no great change from the previous year, except that emigration to the United States was sensibly increased from all parts of Europe. The formal agreement with the British government embodying the arrangement of the building of two new fast mail and passenger steamers, has been completed. In the autumn of 1903, the company inaugurated a temporary service between New York and Mediterranean ports. They have since established this service on a permanent basis by the purchase of two new ships which have been named the Slavonia and the Pannonia, and by the utilization of the Ultonia, which has hitherto been employed in the Liverpool-Boston trade. The company's interests in the New York and Boston trades being attacked by the increased competition of other lines, the directors found it necessary to withdraw from their agreements with those lines, so as to be free to protect the company's share of the business in whatever way might be necessary. The Carpathia, a large passenger and cargo steamer for the Atlantic trade, was received from the builders in April, 1903; the Brescia, for the Liverpool-Mediterranean trade, was received in June. Both vessels have been serviceable additions to the company's fleet. To strengthen the New York service of the company, two large twin-screw passenger and cargo steamers, the Caronia and Carmania, have been ordered from Messrs. John Brown & Co. of Clydebank. The engines of the Carmania will be on the turbine principle. In order to obtain the most reliable opinion on the suitability of turbine engines for the two new fast steamers to be built under the agreement with the British government an influential committee of experts was appointed in September last to make a full and exhaustive inquiry into this subject, and to report upon it. The report has now been received, and after full consideration, it has been decided to adopt the turbine system for the ships referred to. The various services of the company have been carried on with efficiency and the vessels and machinery maintained in excellent order. With regard to the fleet, this has been largely augmented during the past year by the introduction of the new steamers, Carpathia, 13,564 tons, Slavonia, 10,605 tons, and Brescia, 3,235 tons. But during the coming year a much larger addition is likely to be made to the tonnage, and for the first time in its history the company will possess craft of over 20,000 tons gross, for the three steamers building are the Caronia and Carmania, each of about 21,000 tons gross, and the Pannonia of 10,500 tons. With these the total tonnage of the fleet will be brought up to 191,703 gross tons, and the indicated horse power to 202,608. When the next balance sheet comes to be issued there will also appear as building the two new fast liners to be constructed under the agreement with the government, and a model representing which is now under construction and will shortly be shipped to America to be included in the display of Cunard models at the St. Louis exhibition. I may add that the profit earned for the previous year by the Cunard company was £263,617.3.4, or £8,349 less than during the year just closed. The dividend paid in 1902 was also at the rate of 4 per cent per annum.

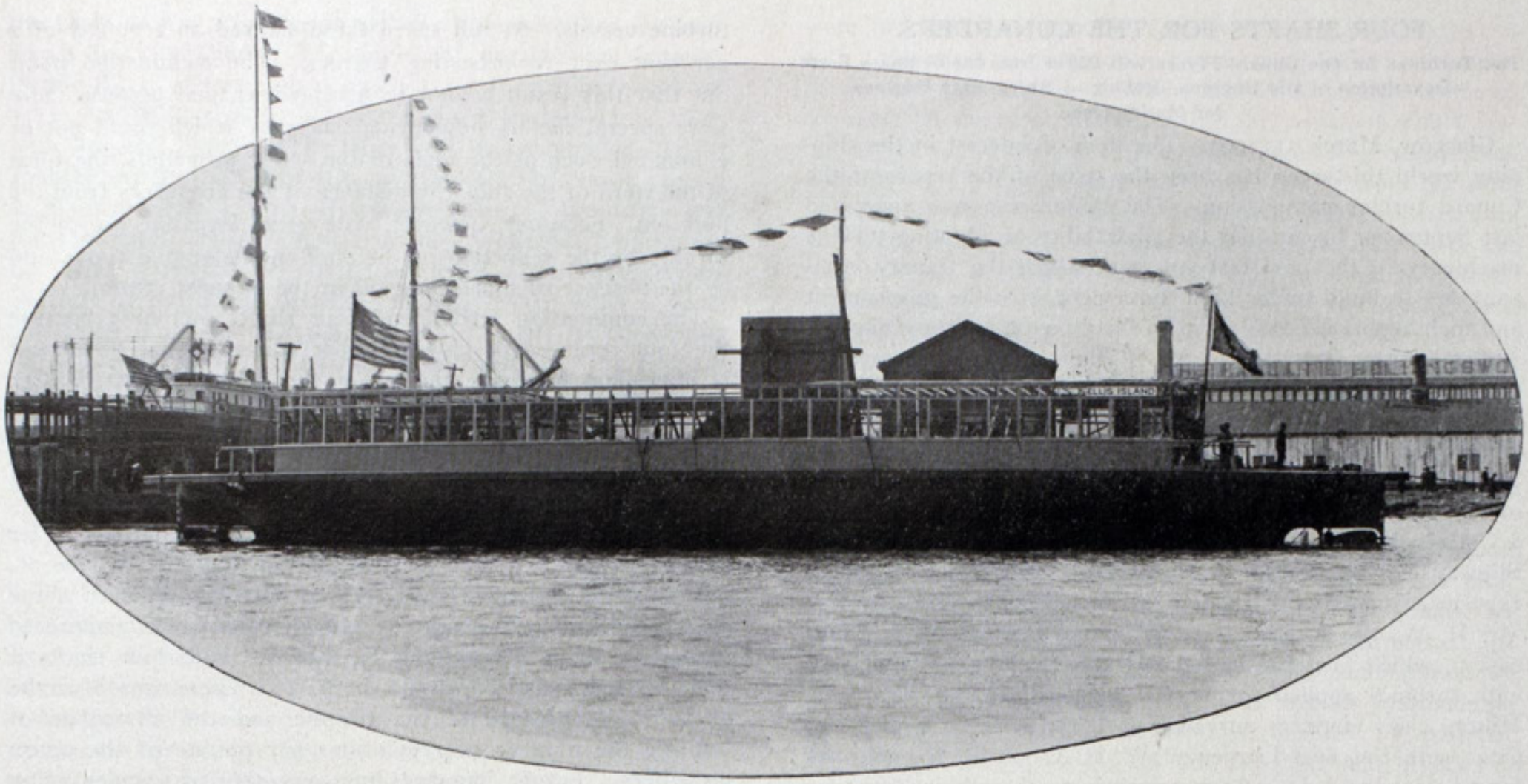


LAUNCH OF THE FERRY BOAT ELLIS ISLAND.

[Building by the Harlan & Hollingsworth Co., Wilmington, Del.

TURBINE STEAMER FOR THE GREAT LAKES.

The great lakes are to the fore also this week in the matter of turbines. Messrs. R. & W. Hawthorn, Leslie & Co.,



FERRY BOAT ELLIS ISLAND.

ship builders, Hebburn-on-Tyne, have this week launched what they describe as the first turbine vessel for either the cargo or passenger service to any part of America. The vessel which has been named "Turbinia," is being built to the order of the Turbine Steamship Co. of Hamilton, Ont., and with her delivery will inaugurate a new service from Hamilton to Toronto. She will be specially suitable for the passenger service on the great lakes, and she has been built to the British Board of Trade requirements, and also to those of the Canadian government. She will carry between 1,500 and 2,000 passengers, and the provisions for their comfort are of the best description. Her engines consist of three Parsons compound steam turbines, namely, one high-pressure in the center line of the ship, and one low-pressure turbine on either side. Each will control an independent line of shafting, and there will be three propellers, one on each shaft. The reversing turbines are of special size, and are incorporated in the low-pressure turbines to admit of the boat being worked astern. Steam will be supplied by two large cylindrical boilers, and the propelling machinery will be capable of obtaining a speed of 21 miles an hour. It is expected that the Turbinia will begin running about the beginning of the next year.

There is little information of an authentic nature to be got on this side of the Atlantic relating to the alleged cutting of rates by the steamship lines plying between New York and European ports. The statement, however, cabled from New York that the Cunard Line has cut its steerage rates between Scandinavian ports and America from $34.25 to $16 to meet the competition of the International Mercantile Marine Co., is, however, not quite correct. The Cunard managers here say (and they decline to be drawn further than to make the general statement) that they have not cut the Scandinavian steerage rate to the extent reported.

IMMIGRATION INTO CANADA.

Special interest attaches to the sailing this week of the Canadian Pacific Railway Co.'s steamer Lake Erie, from the fact that under the agreement entered into with the German lines, she is the last Liverpool boat to carry southern continental emigrants, the Liverpool steamers now being reserved exclusively for English, Finnish and Scandinavian passengers. It is thought that this action of the company will be thoroughly appreciated by the English emigrants. The Lake Erie carried 1,200 passengers, this number including a large number of continental and 400 British emigrants for the Northwest farm lands. As showing the heavy emigrant traffic to Canada just now, the ship's berths of this company are nearly all booked up to quite late in the spring. The Allan Line which has had a large share of the emigrants, has had an exceptionally busy winter season, and there is every promise that the summer traffic will exceed all records. Their royal mail steamer Bavarian recently sailed with 1,503 passengers, and they have recently experienced a special demand for second-class accommodation, in consequence of which they have had to arrange to send extra steamers. Messrs. Allan somewhat regret that they did not order their two new turbine steamers that are now building earlier, as they would have been pressed into service to meet the emigrant tide, and splendid business would have resulted. The first of the vessels, the Victorian, is expected to make her maiden voyage about Sept. 29, and will be followed early in the new year by her sister ship, which has just been named the Virginian. Each of these magnificent craft is 12,000 tons.

The International Union of Sailing Ship Owners, about which little has been heard of late owing to the regrettable illness of its promoter, Mr. R. W. Leyland of Liverpool, has been virtually established during the last few days. It will be remembered that the foreign owners of sailing ships insisted on the adhesion of at least 75 per cent of the British owners if the union was to become a fact. The present position is that signatures have been obtained to an amount of 30,000 tons, within the required total. Recently British owners have joined the union, representing 170,000 tons. Of these 130,000 tons are Welsh, representing some of the largest owners of sailing ships in Liverpool, on certain conditions which have been accepted. These are principally that an additional member be added to the international committee, making three delegates from the Liverpool district; the committee are to have power to fix different minimum freights for ships of different sizes; power also to call on each member to disclose on oath the conditions and freights of any charter, also that breaches of the regulations be punishable by liquidated damages at the rate of not less than 1s. 3d. per ton of the deadweight capacity of the ship. A meeting of the Liverpool ship owners is to be held shortly at which the formation of the union will be officially notified.

FOUR SHAFTS FOR THE CUNARDERS.

The Turbines for the Cunard Flyers will Differ from the Ordinary Form —Description of the Engines—Rolling of Ships—Gas Engines for Marine Use.

Glasgow, March 31, 1904.—The item of interest in the shipping world this week has been the issue of the report of the Cunard turbine commission. The commission was appointed last September to consider the advisability of adopting turbine machinery in the new fast steamers which the Cunard company are to build under their agreement with the government and their report is confidential to the directors of the company. The committee consisted of Mr. J. Bain, the general superintendent and superintending engineer of the Cunard company (chairman); Sir William White, K. C. B., late assistant controller and director of naval construction at the admiralty; Engineer-Rear-Admiral H. J. Oram, deputy-engineer-in-chief of the navy; Mr. T. Bell, engineering manager of John Brown & Co., Clydebank, and Mr. A. Laing, manager of the Wallsend Slipway & Engineering Co., who have both had exceptional experience in the construction of the largest marine engines; Mr. H. W. Brock, partner in William Denny & Bros., Dumbarton, which firm has had the largest amount of experience with turbines applied for marine propulsion; and Mr. J. T. Milton, chief engineer surveyor of Lloyd's Register of Shipping; with Engineer-Lieutenant W. H. Wood, R. N., who has for the last three years been secretary to the admiralty boiler committee. The work of the commission has been largely experimental. Two series of comparative tests have been carried out—one on shore, at the Neptune Bank station of the Newcastle-on-Tyne Supply Co., and the other afloat, with the steamships Arundel and Brighton, of the Newhaven-Dieppe route. Both ashore and afloat the relative economy of the different types of engines was determined by the steam consumption per unit of power, and to obtain this tanks were fitted by means of which the condensed steam from the engines was accurately measured. Tests were made with reciprocating engines and turbine motors running at various proportions of full power and full speed, the output of electricity being recorded in each case. The Arundel and Brighton are sister vessels, the only difference being in the machinery, the Brighton having turbine motors and the Arundel reciprocating engines. Throughout their investigations the commission were aware that turbines necessary to propel the new Cunard ships at the speed contemplated involved a very great step in marine propulsion, the largest turbines at present in use afloat being those on the steamship Queen, engaged on the Calais-Dover service. The design and dimensions of the new ships also required much careful thought and attention and the directors had exhaustive and careful experiments made in regard to the best form for the ships. The turbine commission now decide that the turbine should be adopted, and that four shafts and four sets of turbines are to be preferred to three. The commission give many data as to the results of the various experiments made, and see no reason why the turbine should not be adopted.

The advantages and disadvantages of the turbine system are discussed in their report, but little saving of weight or area is claimed. The machinery of the new ships, to maintain under all weather conditions a mean of 65,000 I. H. P., will be only 300 tons lighter than reciprocating engines; but the commission advise the company not to rely on this saving by adding the 300 tons to cargo or other accommodation, but to hold it in reserve in design for machinery. One important disadvantage dwelt upon is the lack of economy at low speeds; but it is pointed out that as the new Cunarders will always run at a uniform speed of 24½ knots, this should be considered a minimum in proportioning the turbines; at that speed the greatest power will be secured, and then the coal and steam consumption should be superior to the reciprocating engines. The only data possible in connection with marine turbines were deduced from trials with the English channel turbine vessels. At full speed these showed an economy of 2 per cent over reciprocating engines. The commission point out that this result cannot be accepted as final because there were several factors influencing efficiency which could not be eliminated, such as the form of the screw propellers, the form of the stern of the ship, the distance of the propellers from the hull, etc. Economy, however, will result from the use of the turbine by the reduction of the staff in the engine room, and by the absence of lubricating oil in the exhaust steam.

The commission recommend four shafts, not only because the four screws will give a higher efficiency, but because it is imprudent to divide the power through a smaller number of shafts. The commission considered the power necessary to give the sea speed of 24½ knots with various forms of hull, and although 24½ knots can be realized at sea under normal weather conditions it is necessary to have a considerable margin of power to insure that this rate will be maintained under adverse conditions; and for this reason 25 knots will be attained on an extended trial trip. Consequently, with three shafts, the power transmitted through each would require to have been about 25,000 I. H. P., whereas, with four shafts it will not much exceed 18,000 I. H. P. There was also the question of the size of the turbine and the advantage of limiting the number of revolutions per minute of the screw propellers. Large diameter improves the sea maneuvering quality, and the committee started with the proposition that the revolutions should be limited to 140 per minute. This is considerably more than with reciprocating engines, but it compares with 300 to 500 revolutions at which smaller turbine-driven vessels are now run. The design of turbine will differ slightly from that in other ships, but the commission did not consider other systems than the Parsons, since there has been no sea experience with others. Although the rate of revolution is low, the turbines will require to be of great diameter to give the power, and the peripheral speed will consequently be very high, but no greater than with existing turbines. The greater diameter of the turbines affects their arrangement in the machinery room of the ship. As recommended, there will be one go-ahead turbine on each of the four shafts, which will be equidistant from each other. The high-pressure turbines will be mounted on two outside shafts, which will enable the shafts to be far from the center of the ship without interfering with the lines of the hull. These shafts will have the propellers at a considerable distance from the stern of the ship, and thus there will be the minimum of disturbance to the flow of water to the two inside propellers, which will be placed right aft in the usual way. On each of the two inside shafts there will be two turbines. On each there will be two low-pressure turbines for driving the ship ahead. The other two are for driving astern. The power for ahead motion is in two steam units, each with one high and one low-pressure turbine, giving the best expansion of steam; but should there be any breakdown of one shaft, turbine or propeller, the three remaining shafts may be run, and thus only one-fourth of the power will be unavailable. Since the turbine can be overloaded to a greater extent than the reciprocating engines, it will be possible to reduce this proportion of lost power considerably, and with a fractured shaft the sea speed may not fall short of the normal rate by more than a mile or a mile and a half per hour. Another advantage of the four screws and of the two central shafts being fitted with astern driving turbines is that the power for driving astern will be equal to one-half the forward motion power distributed through two shafts.

The commission were not concerned with the boiler arrangements, but it is arranged that these are to be of the cylindrical type, with Howden's forced draft. The coal consumption will exceed 1,000 tons per day. The point to be determined is the form of the stern and propeller brackets, a detail of great importance in the cost of speed. It may affect

the beam of the ship and so far this dimension has not been stated with certainty. The limits of breadth are between 85 and 88 ft. The length is fixed at 760 ft., and a draught of 33 ft. to 34 ft. will be necessary when the vessel is laden with her coal supply. The ships will be constructed one by John Brown & Co., Clydebank, and the other by Swan, Hunter & Wigham Richardson, Newcastle-on-Tyne, the machinery for the latter being supplied by the Wallsend Engineering Co. The contracts are not to be signed until the important question of breadth is decided, but preliminary work is being proceeded with, so that no time will be lost in completing the great enterprise. The commission, including engineers of ripe experience and progressive judgment, point out that many years have been needed to bring the reciprocating engine to its present high degree of perfection, and that little difficulties needing painstaking care may be involved in the great advance now proposed.

THE ROLLING OF SHIPS.

The attention of the Institution of Naval Architects has been directed to the important and (to landsmen) the disquieting subject of the rolling of ships. Herr Otto Schlick, of the Germanischer Lloyd, who has done much towards the reduction of vibration of marine engines, has evolved an arrangement for overcoming the rolling of ships. He was led to the solution by observing the steadying effect of the paddle-wheel of a steamer when by the swaying of the ship it was raised out of the water. In this form it acted in a way similar to the gyroscoping wheel in the toy known as the Archimedean top. Proceeding from this observation, he fitted a model of a vessel with a fly-wheel set on a horizontal axis at right angles to the direction of the length of the ship, to be operated by a small engine. As soon as this fly-wheel was set in rapid motion it overcame the rolling of the ship due to wave motion. In order to try the effect of the installation of a fly-wheel on board of a medium-sized steamer careful experiments were made. The steamer chosen was one of 5,905 tons, with a metacentric height of 17¾ in., and a period of 15 seconds (for the double roll) when not fitted with a fly-wheel. On this vessel he proposed a fly-wheel 13.12 ft. in diameter, weighing 9.842 tons English, having a speed of rotation, measured at the periphery, of 656 ft. per second. At this speed of rotation a wheel carefully designed and made of the best material may be worked without danger. The total weight of the fly-wheel with its swinging frame and motor was about 20 tons. When the vessel had been inclined to an angle of about 4° from the upright, it would by the use of the fly-wheel reach an angle of inclination of only about 1° with the next roll, and with the second roll would come almost to rest again, while the same vessel without the fly-wheel would probably come to rest after from six to seven rolls. Even with the scarcely practicable roll of 18° in one direction, the oscillation of the ship would, as a result of the rapid motion of the fly-wheel, come to rest in four or five swings to and fro. But in ordinary seas the action of the fly-wheel would obviate considerable angles of heel being attained, whereas without the fly-wheel rolling would be maintained, if not increased, by the accumulated effect of a series of waves.

GAS AND OIL ENGINES FOR MARINE PURPOSES.

With regard to gas and oil engines for marine purposes Mr. J. E. Thorneycroft, son of the well-known torpedo boat and launch builder, says that such oil and gas engines necessitate the employment of some complications which steam engines avoid, but the one great advantage of their requiring neither boilers nor condensers more than compensates for these complications. He compared the space occupied by alternative systems in a typical destroyer, showing that petrol engines took only about 60 per cent of the space needed by steam machinery, leaving much more room for the crew. Petrol is more expensive than coal. On the other hand, as the engines were practically automatic in action and could be started at once (requiring no preparation like a steam boiler) an engine driver could usually be dispensed with, and as the steersman could do all the work of controlling the vessel, it would frequently be found cheaper to run with this class of engine than with steam. While there is very little danger from fire with properly constructed engines, fitted with electrical ignition, and using spirit or oil of a low flash point in open boats, the risk must not be disregarded where they are fitted in a closed engine room below decks. With engines of the second class, using oils having a flash point above 75° F., there is practically no danger from fire, and when the engine would work with less than 1 pound of oil per horse power hour, the cost of working will, as a rule, be found less than that with the equivalent steam machinery; but there has always been the disadvantage of an objectionable exhaust. The Deisel engine costs only one-tenth of a penny per hour, as it works with unrefined oils, which can be bought for twopence per gallon, and uses less than ½ pound of oil per horse power hour. Only the most economical steam engines, supplied with coal at not more than 10s. per ton can equal this performance. Mr. Arthur F. Evans says that 1903 will ever be memorable as the year that initiated the speed contests in marine automobiling. It saw the production of an excellent boat by Thorneycroft and another built by the Saunders company and others. In each of these boats a stride was made both in speed and easy running, and also in price. Up to then £300 was the top price for a motor boat. Twice this amount would not have bought the cheapest of those mentioned, and the year's racing showed the enormous possibilities there were for boats of this kind. The four-cylinder Napier marine motor gave 80 B. H. P. at 1,000 revolutions and weighed with all its accessories (not including the reversing gear and shaft) 1,045 lb., is 31 in. high, 48 in. long and 26 in. wide, and is perfectly balanced. It had forced lubrication throughout, hollow crank shafts and hollow steel connecting rods, and was so flexible that it could be run at from 150 to 1,500 revolutions. It requires no great stretch of the imagination to foresee the possibilities of such machinery for high speed craft designed for even more serious work than motor launch racing. Mr. Evans suggests the possibilities of a battleship carrying on deck four boats 60 ft. long, having a speed of 30 knots, and carrying a 14-in. torpedo tube. They would not weigh five tons each, and might be handled by a crew of four.

An insurance has been effected for £140,000 on three of the merchant steamers recently captured from the Russians by the Japanese navy. These vessels, which are now under the management of the Osaka Shosen Kaisha, are to be converted into transport ships for the use of the Japanese. Two of them, the Argun and Mukden, were formerly owned by the Chinese Eastern Railway Co. of St. Petersburg and Port Arthur, and are valued at £40,000 and £15,000 respectively. The third is the Manchuria, valued at £85,000, which recently belonged to the Russian East Asiatic Co. of St. Petersburg. At the time of her capture she was insured partly in London for £75,000 against war risks only, and underwriters on this insurance are liable for a total loss. The Manchuria is a boat of 6,193 tons, built at Copenhagen in 1900, classed 100 A1 at Lloyd's, and fitted with electric light. Under Japanese ownership these three steamers are insured against all risks, except those of war, for twelve months at a moderate premium, underwriters accepting the business as first-class risks.

The United Steamship Co. of Copenhagen, owners of the two large liners, Hellig Olav and United States, built recently at Glasgow, intend to withdraw their twenty steamers (85,000 register tons altogether) from the American service, and to sell their boats to foreign companies. What a fall was there, my countrymen! The iron of which the late famous and favorite Anchor liner City of Rome was built has been used up by the Hamilton Iron & Steel Co., Ontario, into agricultural implements.

BATTLESHIP VIRGINIA.

The most recently designed American battleship, embodying the mature experience of the naval experts, is typified in the Virginia, which was launched from the yard of the Newport News Ship & Engine Building Co., Newport News, Va., on April 5. Congress in March, 1899, appropriated money for three coastline battleships carrying the heaviest armor and most powerful armament for vessels of their class, and increased this number by two of like character in June, 1900. These five vessels are intended to whip anything hitherto proposed at home or abroad, and naval officers familiar with their characteristics believe that the construction bureau of the navy department and the contractors have fully met the evident purpose of congress in this regard. Of the five vessels appropriated for three were required to be sheathed and coppered, and two were without sheathing. Immediately after awarding the contracts, however, the navy department took this question under consideration and decided to omit all outside sheathing and coppering, so that each vessel of the class is now a counterpart of the other, except for minor modifications incident to construction.

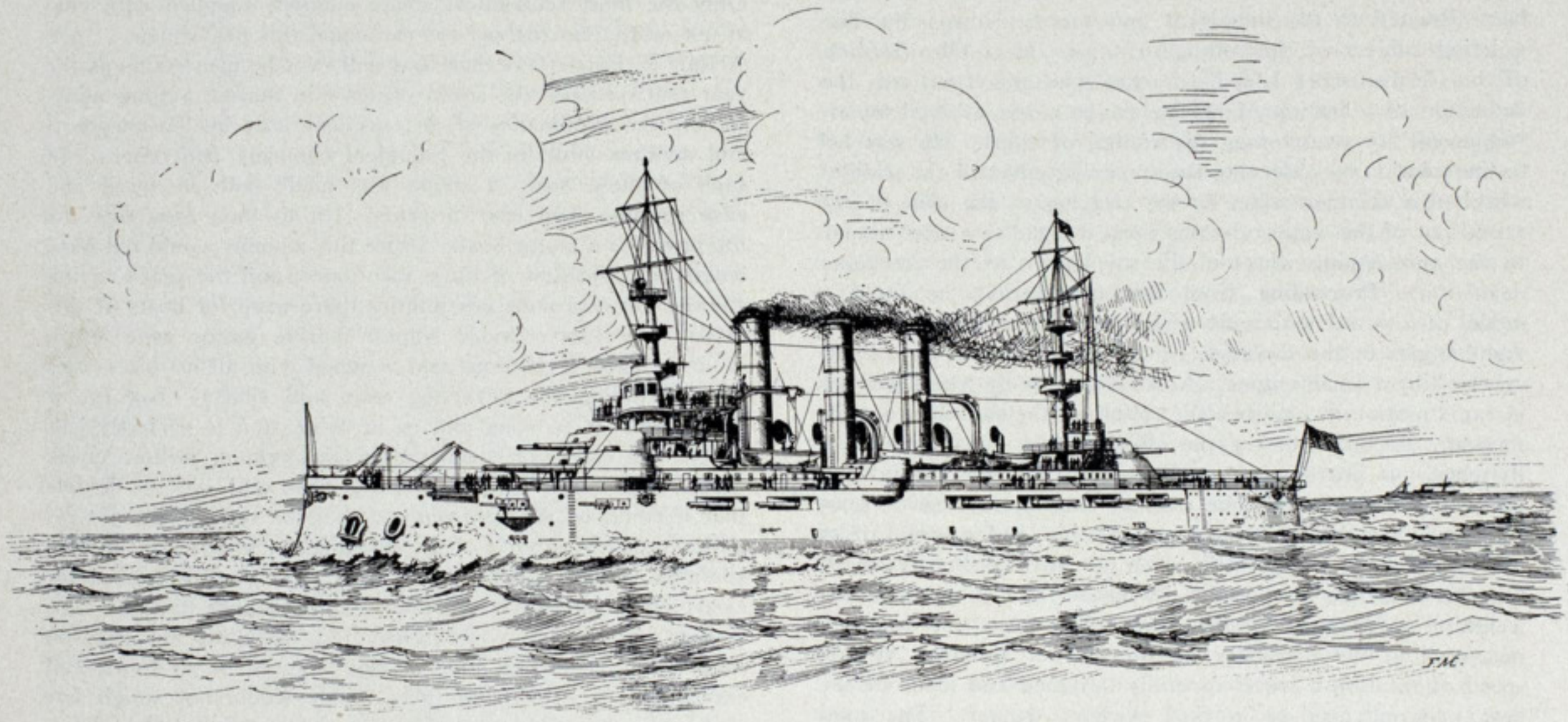
The general dimensions and chief characteristics of these vessels are: Length on load waterline, 435 ft.; breadth (extreme) at load waterline, 76 ft. 2½ in.; trial displacement, about 14,948 tons; mean draught at trial displacement, about 23 ft. 9 in.; greatest draught, full load, about 26 ft.

In the 15,000 tons represented in each of these vessels, the many antagonistic qualities essential to a perfect fighting machine have been compromised and incorporated in the proportion which experience seems to have pointed out as the most desirable and efficient. To begin with, these battleships will have a speed of at least 19 knots, which compares most favorably with any battleships under construction abroad, as well as with any in the projected stage.

The Virginia will be propelled at this high speed by twin screws driven by two four-cylinder triple expansion engines of about 19,000 I. H. P., having a stroke of 4 ft. running, under conditions of maximum speed, at about 120 revolutions a minute. The steam necessary to this power will be supplied at a pressure of 250 lbs. a square inch, by twenty-four Niclausse water-tube boilers, placed four in each of six independent watertight compartments.

The Virginia will carry four 12-in. guns, .40 caliber in length, mounted by pairs in balanced turrets, one turret being forward of the super-structure and the other aft, and each having a total arc of train of 270 degrees. Of the eight 8-in. guns, .45 calibers in length, which will be carried on this vessel, four will be mounted by pairs in turrets, superposed on the 12-in. turrets above mentioned, and four in two broadside turrets slightly forward of amidships, the amidship turrets having a total arc of train of 180 degrees. In the Virginia there will be a broadside battery on the gun deck of twelve 6-in. rapid-fire guns, .50 caliber in length, mounted six on each side, each with a total arc of train of 121 degrees. The secondary battery will consist of twelve 3-in. .50 caliber rapid-fire guns, twelve 3-pounder semi-automatic, eight 1-pounder heavy automatic, two .30 caliber machine guns and six .30 caliber Colt automatic guns, all mounted in commanding positions and having large arcs of fire. The Virginia will also be fitted with submerged torpedo tubes.

The magazines will be specially fitted to enable her to carry, with absolute safety in all climates, the new smokeless powder. Provision will be made in the magazines for the storage of at least sixty rounds for each of the 12-in. guns, 125 rounds for each of the 8-in. guns, 200 rounds for each of the 6-in. guns, 300 rounds for each of the 3-in. guns, and a plentiful supply of ammunition for the smaller guns.



BATTLESHIP VIRGINIA AS SHE WILL LOOK WHEN COMPLETED.

[*From a sketch furnished by the Navy Department.*

So much for the vessel's offensive qualities. To make her defensive qualities proportionately great, she will be provided with a complete waterline belt of armor, 8 ft. in width amidships, 11 in. thick at the top and 8 in. at the bottom, tapering to a uniform thickness of 4 in. at the ends of the vessel. She will also have a casemate armored belt, extending over about 245 ft. of her length, of a uniform thickness of 6 in., rising from the top of the main belt to the upper or main deck, and joined at its after end to the barbette of the 12-in. turret by a 6-in. armored bulkhead, and having at its forward end an armored bulkhead of 6 in. thickness, extending from side to side, thus forming a citadel or redoubt, within which the 6-in guns will be mounted. Within this citadel or redoubt, and extending from the forward turret to the after turret, light armor 1½ in. and 2½ in. in thickness will form subdivisions of the gun inclosures, thoroughly protecting the gun's crews from flying splinters and fragments of bursting shells. The barbettes for the turrets of the 12-in. guns are to be 10 in. in thickness for that por-

tion outside of the redoubt or citadel, reduced to 7½ in. within. The turrets themselves will be protected by armor 12 in. in thickness. The 8-in. turrets will, in all cases, whether superposed or independent, be protected by 6 in. of armor, with 6½ in. port plates, and their barbettes will be protected by similar armor. The conning tower and its shield will be 9 in. in thickness, and the armored tube, 5 in. thick, will be of sufficient size to receive all voice pipes, wiring, etc. In addition to the conning tower, there will be, aft, a second tower, known as the signal tower, which will be constructed of 5-in. armor. From the bottom of the waterline armor belt there wll rise a curved turtle backed nickel steel protective deck, 1½ in. thick on the flat and 3 in. thick on the sloping sides, to make assurance doubly sure that no projectile of the enemy finds its way into the vitals of the ship. As an additional protection to stability, a cofferdam belt, 3 ft. in thickness, and packed to a density of eight pounds to the cubic foot, will be worked along the two sides, above the protective deck, for the entire length of the vessel.

The material of construction is the high quality of steel which has entered into all the vessels of our navy. The main, or upper deck, in addition to being built of steel, will be the only one upon which wood is to be laid. The lower decks will all be of steel, covered with linoleum. The use of wood in the construction of this vessel will be limited even more strictly than it has been in the later battleships, and all woodwork above the protective deck, except deck plank, will be fireproofed. Bilge keels and heavy docking heels are fitted. It is proposed to make all the vessels of this class flagships, and to do this it is necessary to make provisions for the accommodation of one flag officer, one commanding officer, one chief of staff, nineteen wardroom officers, ten junior officers, eight warrant officers and 772 crew, including sixty marines, making a grand total of 812. Both officers and crew will have washrooms, bathrooms and other similar conveniences, such as will place the comfort and healthfulness of these vessels very high in the scale.

The applications of electricity on board are much wider than in the case of any other battleships in existence, with the possible exception of the Kearsarge and the Kentucky. All the turrets have electrical turning gear, and the ammunition hoists, blowers to the turrets and general ventilation, the general workshop and practically all of the auxiliaries outside of the engineers' department and excepting capstan and steering gear, are to be electrically driven. To provide for the power required for these purposes there will be installed eight engines and dynamos, mounted on combination bedplates, two having a rated output of 1,250 amperes at 125 volts and six with 625 amperes at 125 volts.

In this class of vessels all the latest approved equipment will be provided for the accommodation of the officers and crew, the ventilation and drainage being of a high standard; the hospital quarters airy and commodious; the bakery and galleys, with their issuing rooms and refrigerating plant, having been worked out with a view to thorough efficiency; laundry and drying rooms are fitted with the latest machinery, electrically driven, and the living quarters are carefully protected by insulation from cold in winter and excessive heat in summer. Take it all in all, the designs of the Virginia class embody the latest developments in naval architecture, and these vessels will prove most formidable additions to the fighting strength of the navy.

The new cruiser Denver made a second attempt last week to come up to the speed requirements in a trip over the Cape Ann course. Her average speed for four hours was 16.70 knots per hour, but the contract requirements were for 17 knots. The navy department will accept the cruiser at the reduced rate. She was built by the Neafie & Levy Ship & Engine Building Co., Philadelphia, Pa.

SEEN AND HEARD ON THE LOOKOUT.

According to the latest reports the United States may soon "read its title clear" to the Panama canal. Though none need suppose that its cost can speedily be defrayed by its revenue, the project of this new waterway is almost unanimously popular in this country. For obvious reasons it is favored by those interested in shipping; patriotic enthusiasts are delighted with the idea of having the stars and stripes displayed at both terminals, and thousands are ready, like Mr. Pickwick in the Eatonswill campaign, "to hurrah with the largest crowd." It is the opinion of international real estate experts that the strip of land known as the "canal zone" is worth, with its concessions, $40,000,000. Upon payment of this sum, and an incidental $10,000,000 "douceur" to the Republic of Panama, the uninitiated confidently believe that the influx of the pick and shovel brigade immediately will commence. But this might be called reckoning without the climate. While it cannot be conceived that anyone could doubt America's ability to pay a paltry sum for a much needed waterway, no country can conscientiously afford to send its subjects into the region of the yellow fever's definite polarity without previously adopting measures for preventing, or, at least, restricting, a prevalence of disease among the diggers. At a dinner in New York city recently, given in honor of Dr. St. John Prossa, the latter, speaking of the altered position of the medical man, said: "Formerly he only sought to cure; now to prevent." And in imitation of these altruistic medical men of the twentieth century the canal commission is now devising plans to demonstrate their belief in the maxim "Prevention is better than cure." In this connection it may be interesting to hear of methods in another part of the world to prevent a spread of cholera. Several cases of this dread disease having been brought to the notice of the authorities of the Island of Java some years ago, captains of vessels, employers of labor, and the public in general were commanded, under penalty of a heavy fine, to report to the nearest health officer anyone complaining of pains in the stomach. A thoughtless mentioning to a French captain, whose acquaintance I made in a Batavia hotel, that I did not feel well since eating a certain foul smelling, though tasteful native fruit, resulted in my being examined by a physician and my ultimate temporary banishment to a place devoted to the manufacture of cholera immunes. Crowds composed of men from all walks in life, and whose only points of similarity were a white skin and a stomach ache, traveled to this concentration camp. In this camp one had to rise at 5 a. m.; then bathe in ice cold water that had been ingeniously collected by means of a system of Camboo pipes, and partake of breakfast at 6 a. m. At 9 the government's cholera experts paid visits to their compulsory patients, and at 12 another meal was served. After 10 a. m. cold beverages could no longer be procured, but luke warm tea may be had for the beckoning. At 3 p. m. attendants compelled all to retire to their Camboo sleeping apartments with explicit instructions to remain there until "reveille" at 5 a. m. next morning. A country in which martial law has been declared may be regarded as a land of freedom compared with Java at a time when a medical man was given the power of a Torquemada. Again referring to Panama—work on the canal is presently going to be resumed more vigorously than ever. Should the canal commission, however, permit doctors to round up anyone afflicted with a headache the building of sufficient hospitals will be a greater undertaking than the actual canal digging.

The tardy withdrawal of the winter's forces did compel yachtsmen to postpone until an exceptionally late date the usual preparations for a season of aquatic pleasures. The majority of the yachts in ordinary in the basins along the north Atlantic shores retained their unsightly winter covering long after the date which in preceding years saw them resplendent

in all their spring finery. But neither unpropitious weather conditions can dampen the ardor, nor icy gales cool the enthusiasm of the average American yachtsman. Among the many races that are expected to take place during the coming season there is one in which all yachtsmen are at present evincing a marked interest. When speaking of yacht races one generally pictures a speed contest between craft that are sailed by professionals. But in the race here alluded to the speed developed by any of the contesting boats cannot be regarded even as an important factor. An enumeration of some of the rules that have been adopted for this novel contest may give your readers an inkling of the reason for the interest it awakened. First, the course to be from Sandy Hook around Nantucket shoals lightship to Marblehead—a deep sea trip of 300 odd miles. Second, no big boats are permitted to compete, and because yachtsmen might be unable to agree as to what constitutes a "big" boat the further stipulation is added that competing yachts are limited to a length of 40 ft. over all: third, with the exception of a cook on board each yacht no professional mariners may successfully apply for a berth, and each of these cooks will be strictly enjoined to confine himself exclusively to his particular duties; fourth, while care is taken to bar vessels over a certain length in the matter of rig and draughts the competitors may suit themselves, and with the single proviso that each yacht must carry a first-class tender all kinds and conditions of craft may start on the appointed day—July 23d. The crew of each yacht is limited to four. Before the start the captains must satisfy the racing committee that they have provided themselves with the necessary instruments for navigating as well as a log book in which hourly entries must be made during the entire duration of the trip, an extra prize being offered for the best kept log. A master of craft who is also a master of nautical literature has here an opportunity to win his spurs. The lower sails must be those that have been regularly used for cruising, but in the matter of light sails—usually alluded to as "flying kites"—yachtsmen are to enjoy the utmost latitude. During calms, towing by tender is permitted. In conclusion it may be said that the object of this race is, not to prove which of the contesting craft is the faster, but which crew is the most skilful in the useful and pleasureable art of sailing a member of the yearly enlarging mosquito fleet. The contents of the log books may prove also conclusively each captain's fitness for his voluntarily assumed exacting position. With due deference to Sir Thomas Lipton—who offers the principal prize—many yacht owners show more interest in this novel race than they did in last year's international speed contests.

Notwithstanding innumerable international rules for the guidance of nations that consider it incumbent upon themselves to engage in armed naval strife, the neutral, unmartial "man in the street" decides that especially in modern war all is deemed fair. The accounts of the iron sailor performing deeds of valor in pursuance of his duties on the wooden man of war have been relegated to the pages of the dime novel. And even a graphic description of one of these naval battles, in which brute strength and courage were potent factors for deciding the day, is to the average layman more gratifying as regards the matter of "fair play" than learned accounts of scientifically destructed floating forts. A French journal devotes much space to a discussion of submarine mines. From it was learned that some of them explode upon coming into contact with a vessel, and are called contact mines, while others, named observation mines, are fired by electricity. Dormant mines—"dormant" from the French verb "dormir," to sleep—are those that innocently repose on the bottom and raised by men on shore, by means of a cable to which they are attached, upon the approach of the enemy's ships. The advice not to awaken sleeping dogs should apply equally to dormant mines. Herewith a pen picture of imminent probabilities of modern naval warfare's possibilities.

The scene represents the outer harbor of a seaport town where the advent of the enemy's armor clads is momentarily expected. Said bay has been, of course, mined to the satisfaction of the most critical experts who had taken charge of this method of annihilating the opponent. Wires attached to these mines are conducted to a safely hidden underground chamber. On the roof of this chamber a "camera obscura" has been placed, while through an opening in this roof a mirror throws the reflection of any object floating in the bay on a chart spread on a table in the hiding place. Said chart consists of a white sheet of paper thickly marked with numbered crosses, each cross representing a mine, and its number corresponding with a similar one on an electric button, or "firing key." A man of war arrives in the bay and and her progress is carefully watched by the occupant of the underground observatory. The mirror accurately records her position in relation to the mines. Perhaps with something that might be attributed rather to luck than wisdom her course thus far has led her safely between a row of mines. The watcher's hand slowly moves to that key whose number tallies with the figure on the cross near which the vessel's reflection is hovering. At last said reflection covers a certain cross; a key is quickly touched, and the ruler of a nation presently receives from the seat of war a note commencing: "I regret to report," etc. A general once gave it as his eminently reliable opinion that "war is hell." Anyone conversant with the subtleties of the English idiom of speech might feel inclined to slightly modify the general's statement, and, when referring to some phases of naval strife, declare that "war is hellish."

During a heavy fog last winter a German passenger boat ran aground off the Dutch coast. While this accidental delay of the steamer must have been expensive to the company and annoying to the passengers there was never a moment during the time of the craft's involuntary detention that any danger of a probable loss of life was felt. A Berlin paper now claims that the Dutch government, heeding a petition from the inhabitants along the Zealand coast, refused the imprisoned steamer's request for assistance. It is further stated that the probability of the steamer's ultimate destruction, and the prospect of salvage induced these coast inhabitants to send their incongruous petition to the authorities. The fact remains that there was some delay in the work of liberating the boat, but authorized piracy should not be given as the cause. Holland has been described as a country the edges of which had been turned up to keep out the water. On two places along the coast artificial edges had to be provided, and these are called "dykes." "Dune" is the name of the bulwark provided by nature, and these dunes are small sandhills upon which a plant grows called "helm." As the plant prevents the scattering of the sand during a strong breeze, the law sedulously guards its precarious existence. In short, any attempt to turn down these edges would be regarded by Hollanders as would some captain's threat to scuttle the ship. And now to return to the unfortunately situated German steamer. Imbedded in the sand, and resisting the united efforts of numerous powerful tugs, her captain sends a request for a suction dredge. And to let such a dredge scoop a path seemed feasible to all on board. But the inhabitants of the island of Walcheren, fearing that this violent disturbing of the ocean bottom might damage their dykes and dunes, naturally protested. And no sane person would call this an act of piracy. F. H.

The Ocean Steamship Co. last week made a change in the plans on one of its two ships building at Roach's Ship Yard, Chester. The alterations will make accommodations for second-class and steerage passengers. While considerable extra joiner work will be required the vessel, which has not yet been named, will be turned out on contract time.

GENERAL SITUATION AT BUFFALO.

Buffalo, April 12.—There are apparent about as few features that promise success to the lake fleet this season as has been the case in a decade, spite of the generally poor showing made last season. There has arrived the time by the calendar when there is a general activity all along the lakes, but never has the vessel owner till now allowed the middle of April to draw so near with such apparent indifference to his floating interests as now. An old lake captain and vessel owner speaks of the state of things as quite phenomenal. There have been seasons that promised very little more at the opening than this one does and yet the fleet was almost as eager to start out and try the uncertainties of the business as ever. There have been not a few times when the first Chicago grain fleet has come down to Buffalo, only to unload and then wait for business or go back light after more grain. This year there is no grain fleet to come and there is no ore fleet to start out. A large handler and smelter of ore here estimates that there will not be over two-thirds of the ore to move this season that there was last, though he is preparing for an active season for all that.

Whatever the other ore ports may do it appears that Buffalo will need more ore this season than ever before and yet her full capacity will not be reached till the season is well under way. The steel plant ought to increase its consumption largely, as it was in operation only a part of last year, and has not yet reached capacity by considerable. The big pig iron plant of the Buffalo & Susquehanna Co. will start up before long, although it is learned that the ship canal leading to it will not be ready for use by July, as has been stated, and may not be ready this season at all, owing to complications about the right of way. Still the furnace will start up before long, the ore being provided by rail from existing docks. Both the Tonawanda and the Punxsutawney furnaces of Rogers, Brown & Co. will be active.

Buffalo will ship the average amount of coal by lake this season, and is already loading vessels at a fair rate, though the coal supply is not as large as it usually is at this time of the year. The package freight fleet is anxious to get away, but has made scarcely more effort to get ready than any other craft. It has plenty of business waiting for it, but the wage problem must be solved before it is proper to commit the companies to action.

Though it appears that Buffalo is prepared to furnish its full share of lake business the general apathy that prevails on the lakes is as apparent here as anywhere. Scarcely a captain has been appointed and there is only now and then an engineer at work. It will take more than three weeks for the big steamers to get away after the fitting out is begun. It was supposed that the ice would be a bar to any sort of business this month, but though there has been very little warm weather yet the ice is going very fast. Except on days when the wind is down the lake it would be easy to get out of here, and the one steamer that is ready to go, the new collier of the Pere Marquette, would have been away for Conneaut and the cross-lake coal trade before now but for a report that Conneaut harbor was not open yet. There has been a great amount of snow in the ice and it goes very fast on that account.

Everybody is sorry to learn that the Union Transit package-freight line of Henry C. French is to go out of business, especially as it has been given up largely on account of the continued ill-health of Mr. French, though he is better than he has been for some years. He is one of the men who grew up in the business and prospered as most lake men here, even reckoning successful men only, have not. A summer home on the lake shore with a good farm attached and a winter home in Pasadena, Cal., attest his claim to having earned a right to retire while still a middle-aged man.

The elevator pool situation is waiting for a sign of business before reforming, but as this is about the first season on record with no 10,000,000 bushel Chicago grain fleet in sight for the opening, there is no hurry. The worst of it is the division of earnings for shoveling the grain to the elevator leg, which presents new complications.

Vessel owners complain that the Lloyds Register valuations have made such sweeping reductions, 25 per cent or more on wooden bottoms and $20,000 or so on metal bottoms, that they are cut out of about $4,000,000 by the process. Still it looks as though the step was warranted. Slack business has not only reduced the market value of the fleet direct, but the ship yards, with no new work in sight, will build cheaper than they would last year. It is claimed on the insurance side of the question, that certain vessels have been sold for less than the Lloyds valuation.

OBITUARY.

Capt. Leo Bernard of Sault Ste. Marie died this week. Capt. Bernard was very well known, having sailed the lakes for nearly forty-five years. He was sixty years old.

Lieut. Henry Kennedy Benham, son of Rear Admiral Benham (retired), died at the Key West naval station last week. He was in command of the torpedo boat destroyer Truxton at the time of his death.

Capt. William H. Rogers died at the Sailors Snug Harbor hospital, New Brighton, N. Y., lately. He served throughout the civil war and had sailed on sea-going vessels during the greater part of his life.

Captain William Willis, one of the best known mining men in the Lake Superior region, died at Calumet, Mich. He was identified with iron and copper mining there and in Arizona. He was fifty-eight years of age.

Capt. David J. Conly of Brooklyn was drowned at the League Island navy yard, Philadelphia, last week while superintending the work of dredging the channel. Capt. Conly was one of the best known captains in the east.

Capt. Jeremiah Harrington died at his home in Cleveland this week. Capt. Harrington was born in 1845 and shipped before the mast when a lad of eighteen. During his thirty odd years of service on tne great lakes he had been master of the Fred H. Moore, George H. Warmington, Sophia Minch and many other craft well known to the older generation of lake sailors. Ill health forced him to retire ten years ago.

On April 2, Xavier Boyard, the New York representative of the Panama Canal Co. and a director of the Panama railroad, died at No. 45 West Thirty-eighth street. He was a native of France and had been connected with the company for twenty years. He was sent to this country in 1883 after spending a year at the isthmus studying the situation there. Mr. Boyard was prominent in the latter part of the canal negotiations.

Capt. Thomas H. Howland died at his home at 1768 Eggleston avenue, Chicago, Sunday. Capt. Howland was one of the old-time commanders of vessels on the lakes and was master as early as 1852. His life had been spent upon the water until twenty years ago. The schooner Thomas Howland was named after him and he was one of the first to sail the iron steamers that have been supplanted by steel craft. He brought out in succession all the steamers of the Commercial Line and last sailed the steamer Scotia. He was an old member of the Ship Masters' association.

Capt. Joshua W. Reynolds of No. 181 Hooper street, Brooklyn, who for years commanded vessels plying to the West Indies and Central America, died at Staten Island on April 1. At the age of nineteen, Capt. Reynolds shipped as a cabin boy and in 1861 he became first officer of the Cathay, and three years later he was made captain of that vessel. Some years later he entered the services of the Alexander Line, commanding various vessels running between New York and Havana and Mexico. His last command was the Vigilantia of which he was the captain during part of her service as an army transport in the Spanish war.

DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED
OR ASSOCIATED WITH MARINE MATTERS
ON THE FACE OF THE EARTH.

Published every Thursday by

The Penton Publishing Company,

CLEVELAND, OHIO.

CLEVELAND:	WADE BUILDING.
CHICAGO:	MONADNOCK BUILDING.
DETROIT:	HAMMOND BUILDING.
NEW YORK:	150 NASSAU STREET.

Correspondence on Marine Engineering, Ship Building and Shipping Subjects Solicited.

Subscription, $3.00 per annum. To Foreign Countries, $4.50.
Subscribers can have addresses changed at will.

The Cleveland News Co. will supply the trade with the MARINE REVIEW through the regular channels of the American News Co.

Entered at the Post Office at Cleveland, Ohio, as Second Class Matter.

APRIL 14, 1904.

At last congress has done something tangible for the American merchant marine. The house of representatives last week passed the Philippine shipping bill extending the coasting laws to the Philippine islands. It passed, however, with only a few votes to spare. The bill as it passed the senate made the coasting laws operative to the Philippines operative on July 1, 1905, but the house amended it to take effect July 1, 1906, or one year later. The senate promptly agreed to the amendment so that the bill now awaits the president's signature only to become law. The delay of one year is not vital. The really important thing is that congress has at last done something for the upbuilding of an American merchant marine. It is the first bill which congress has passed for the encouragement of American shipping since March, 1891, when the present postal subsidy law was enacted. With this direct pledge of congress that the Philippines shall be included in the coasting trade, ship building in the United States is bound to be stimulated. Capital will seek investment in that direction immediately, and new steamship lines for the colonies are likely to be established. The opposition made a great deal out of the argument that there were not vessels enough flying the American flag in existence to care for the oversea trade of the Philippines. There was really little in that argument, but two years hence there will be considerably less. Nor need there be any fear that rates will be unduly advanced between the United States and its colonies, which was also one of the bugaboos of the opposition. Such a thing as a trust cannot exist on the ocean. Trusts are influential only when they control natural sources, such as the supply of raw material, or monopolize the right of way; but the raw material out of which ships are made cannot be controlled, and as for the right of way it is the common property of mankind. Anyone can build a boat and everyone may utilize the ocean, Moreover, wholesome competition among American citizens will not cease so long as discrimination does not obtain. If the oversea trade of the Philippines proves attractive there will be an abundance of capital to compete for it and rates will undoubtedly bear the ordinary relation to the investment that obtains in every business which is free for anyone to enter. The Philippine shipping bill is the one voice that has come out of the wilderness for the past decade. It is the voice of hope and encouragement.

The ball has at last got rolling. Senator McComas has introduced a bill in the United States senate to extend the coasting laws to the Panama canal zone, and in an interview in Washington he advocates it along the lines laid down by the MARINE REVIEW in its last issue. Substantially, Senator McComas' proposition is that as congress has passed a law extending the coastwise shipping laws to the Philippines, in like manner the American coastwise shipping laws should be extended to the ten-mile Panama canal zone. The bill provides, as in the case of the Philippines, that from the ports of the United States to the canal zone of Panama all goods should be shipped in ships of American register. Advocating the bill, Senator McComas says that if the immense freight trade to Panama can be preserved to American ships during the construction of the canal it will undoubtedly help to start American lines, not only to the isthmus, but to South American ports as well. The bill provides that the laws shall apply only during the time the canal is being constructed and must terminate when the two oceans are joined, but the senator believes that by that time the various lines will be well established.

During the past few days the MARINE REVIEW has received scores of letters from United States senators and representatives, all of them promising to give the subject of the extension of the coasting laws to Panama consideration, and many of them promising hearty support to the measure. It is urged upon them that they put Senator McComas' bill upon the calendar and pass it at the present session. It is a perfectly legitimate idea and has the merit of eminent practicability. It will give immediate encouragement to American shipping. Thousands upon thousands of tons of material will go in a constant stream from American ports to Panama during the next eight years. If the trade is preserved to American vessels it will result in the building of new steamers and will

benefit the several business conditions of the country throughout. It is a mistake to suppose that a ship concerns only the ship owner and ship builder. There is scarcely a trade that is not benefited by the building of a ship, for a ship is the collective product of a great variety of industries It is the American people as a nation who are paying for the Panama canal, and as a nation they should reap whatever profit there is to be obtained from any industry subsidiary to it.

At the annual dinner of the Cleveland Chamber of Commerce, which was held on Wednesday evening of this week, addresses of far-reaching importance were made. The list of speakers was as distinguished as the chamber has ever had and included Secretary of War Taft, Congressman Theodore E. Burton and Mr. Harvey D. Goulder. As an indication of the growing interest bestowed upon maritime affairs it is to be noted that the shipping development of the country was one of the topics for discussion. Mr. Harvey D. Goulder's speech upon the foreign merchant marine of the United States was electrifying in its vividness. Like Gladstone, he possesses the faculty of weaving a romance out of figures. His statistics were fairly glowing; but they were not creditable to so great a country as this. He clearly showed that in 1838, which is to be regarded as the beginning of commercial ocean steam navigation, the United States possessed more steam vessels than the United Kingdom. The figures were 193,423 tons for the United States and 74,684 tons for the United Kingdom. In that year the United States built 105 steam vessels of 24,158 tons, and the United Kingdom built eighty-four vessels of 9,569 tons. The total tonnage of the United Kingdom, both steam and sail, in 1838, was 2,383,484 tons, while the total tonnage of the United States, both steam and sail, was 1,995,640 tons. The year 1838 is selected because, as stated, it was the year in which steam navigation in a commercial sense was begun. From 1838 until 1860 the United States steadily increased its lead both in sail and steam tonnage over the United Kingdom. In 1860 the steam tonnage of the United States was 867,937 tons as against 452,352 tons for the United Kingdom, while the sailing tonnage of the United States was 4,485,931 tons as against 4,134,390 tons for the United Kingdom, making a grand total for the United States of 5,353,868 tons and for the United Kinkdom .,586,742 tons. These figures show conclusively that the United States was the premier maritime country in the world in 1860 and they prove also that the United States had made more rapid and more extensive strides than Great Britain in the general application of steam to the purposes of navigation.

After 1860 a different tale is to be told. Great Britain adopted the policy of establishing ocean lanes for steam navigation to foreign countries through liberal subsidies for carrying the mails. In ten years Great Britain paid $52,000,000 in subsidies to steamship lines—an amount which was very much greater than the original cost of the fleets of steamers employed. This policy exerted a powerful influence in the development of British steam navigation, which in turn resulted in improvements and extensions of British ship yards devoted to that form of construction. The ascendancy of Britain as the maritime power began when the British government opened its treasury to add capital in extending British trade to all ports of the world. Nor has that ascendancy ceased from that day to this; nor have subsidies lapsed from that day to this, for Britain still pays in postal subsidies and admiralty subventions over $6,000,000 per annum. The United States last year paid $998,000 for carrying its mail.

The review of figures since 1860 is pitiful. The foreign trade of the United States in 1861 amounted to 2,496,894 gross tons; in 1902 it amounted to 873,235 gross tons. On the other hand the coasting trade of the United States in 1861 amounted to 2,704,544 gross tons; in 1902 it amounted to 4,858,-714 gross tons. The coasting trade is protected and it shows an increase of 100 per cent; the foreign trade is not only unprotected, but handicapped in addition, and it has shrunk 300 per cent. Ponder on the following table for a moment and think what it really means:

FOREIGN CARRYING TRADE OF THE UNITED STATES.

Years.	In vessels. American.	Foreign.	Total.	Per cent carried in American Vessels.
1821	113,201,462	14,358,235	127,559,697	88.7
1831	159,508,291	24,993,416	184,501,707	86.5
1841	208,030,515	41,767,465	249,797,980	83.3
1851	316,107,232	118,505,711	434,612,943	72.7
1861	381,516,788	203,478,278	584,995,066	65.2
1871	353,664,172	755,822,576	1,109,486,748	31.9
1881	250,586,470	1,269,002,983	1,519,589,453	16.5
1891	206,459,725	1,450,081,087	1,656,540,812	12.5
1901	177,398,615	1,974,536,796	2,151,935,411	8.2

This table shows that in 1821, when the total foreign trade of the United States was valued at $127,-559,697, American vessels carried $113,201,462 worth of it or 88.7 per cent; while in 1901, when the carrying trade of the United States had reached the enormous total of $2,151,935,411, American vessels carried only $177,398,615 worth of it, while foreign vessels carried $1,974,536,796 or 92 per cent of it. The freight charges on this enormous volume of business are approximately estimated at $200,000,000. Wouldn't it be good policy to do as the late Senator Hanna believed—spend $9,000,000 a year out of the public treasury in order that this $200,000,000 might be retained in the country?

There is another feature which must not be overlooked in this decline of American shipping. It is the fact that during the period from 1850 to 1860 American ships conducted a large amount of the carrying trade between foreign nations, which was even more profitable than certain branches of American export trade. At the present time American vessels conduct virtually none of this carrying trade between foreign

countries. While it is significant that American ships carried a trifle less than 8 per cent of American exports and imports last year, it is more significant that in the trade between the United States and Europe not one American vessel entered or cleared from Germany, Russia, Sweden, Norway, Denmark, Netherlands, Italy, Austria-Hungary or Greece last year.

But the dramatic phase in the situation is still reserved. The last ship for the foreign carrying trade of the United States has been launched and in the whole breadth of this continent-covering country there is none other to take her place. This last vessel is the Manchuria, built for the Pacific Mail Steamship Co.

The United States has a coast line approximating 10,000 miles. It is by nature the premier maritime country in the world. It should also be the principal ship building and ship owning nation in the world, but it is needless to say that it is not. It is patent that this condition is not natural but abnormal and must be the result of artificial influence: The maritime development of the United States would be loose-limbed, free-grown and giant-like under normal conditions. The fact that it is a dwarf proves conclusively that artificial means have been employed to stunt its growth. A great national influence has been unwittingly exerted to restrain the development of American shipping. The federal government has conferred the benefits of protection upon every industry except shipping. To make one great exception to the list puts upon the industry so excepted a tremendous handicap, for it has to fight, not alone the directly aided shipping of other nations, but the burden of added cost of construction and operation as an inevitable consequence of protection extended to other trades. It is clear that American shipping is suffering because it has been discriminated against.

OWNERS TO DEAL WITH MASTERS INDIVIDUALLY.

The executive committee of the Lake Carriers' Association will make a radical change this year in dealing with labor. Last year wage schedules were entered into with the unions on behalf of all classes of labor employed on board vessels. This year, however, the executive committee of the Lake Carriers' Association will not treat with masters through the Masters and Pilots' Association. The masters must deal individually with the owners. Some time ago the Masters and Pilots' Association presented a wage schedule and classification of vessels to the executive committee of the Lake Carriers' Association, but no notice was taken whatever of it. This classification and wage schedule has since been discredited by various members of the association itself, and in fact it has been the cause of considerable friction in the association. There is a disposition on the part of the owners to return to the old policy of regarding the captain as the actual master of the ship, a disposition which is endorsed by the masters themselves, but which is by its very nature inimical to the existence of the union. No one can serve two masters. The captain of a ship cannot represent the owner and the union as well. It is known that this point is very thoroughly recognized by a number of masters who were especially displeased with the action of the association last fall.

No more has as yet been made by vessel owners to employ either masters or engineers though applications have been generally filed with all the owners. Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., the lake end of the Steel Corporation, last week notified a score of masters that he would insist upon treating with them as individuals and not as members of the Masters and Pilots' Association. Mr. Coulby feels very deeply upon this point, saying that the master is the personal representative of the owner aboard and that he should not be hampered by obligations to any other authority. Upon this point all owners appear to be a unit.

Mr. J. C. Gilchrist, who operates the largest independent fleet of vessels on the great lakes, enrolled his tonnage in the Lake Carriers' Association last week and has been appointed a member of the executive committee of the Lake Carriers' Association. At the annual meeting of the Lake Carriers' Association in January last a place was left vacant on the committee for Mr. Gilchrist, because it was expected he would later join. The only important fleets now out of the association are those controlled by James Davidson of West Bay City and Mr. George A. Tomlinson of Duluth. The Lake Carriers' Association is therefore in a very powerful position. The executive committee will deal with labor aboard ship on Saturday of this week.

TOWING COMPANY AND TUGMEN.

The Great Lakes Towing Co. has wiped the slate clean in its dealings with the members of the Licensed Tugmen's Protective Association and will start the new year with every assurance of good feeling. The company is in very sound financial shape, its physical property is in excellent condition, and it has the pledges of the men that good service will be rendered throughout the entire season. In return for this pledge the company will pay last year's wage schedule, which is a high one and which is as follows:

Chicago—	Per Month.
Captains	$161 29
Mates	86 29
First engineers	116 29
Second engineers	86 29
South Chicago—	
Captains	141 29
Mates	86 29
First engineers	111 29
Second engineers	86 29
Duluth, Ashland and Marquette—	
Captains	136 29
Mates	86 29
First engineers	116 29
Second engineers	86 29
Cleveland and all other ports—	
Captains	131 29
Mates	86 29
First engineers	116 29
Second engineers	86 29

Extra captains and engineers will be paid at the same rate of wages as the regular captains and engineers when they are employed for fifteen days or less. If they quit work before the expiration of fifteen days they will receive mates' and second engineers' wages. Winter wages will be paid from Jan. 1 to April 1 inclusive, and will be at the rate of $3 per day for ten hours or less for captains and engineers. For overtime the men will be paid at the rate of 50 cents an hour. It is specifically provided that in the event of any controversy arising between the organization and the towing company the men shall continue at work pending the settlement of the grievance by arbitration.

The Cleveland life-saving station, which is in charge of Capt. Charles E. Motley, was opened for business this week.

AROUND THE GREAT LAKES.

Manager C. O. Duncan of the Port Huron & Duluth Steamship Co. has chartered the steamers Russia and Wyoming for the season.

A new chart in colors of Ludington harbor, Mich., has just been issued by the United States lake survey. It can be procured from the Marine Review.

Peter Gussenbauer, government lighthouse keeper at Monroe piers, died suddenly on Sunday last from a stroke of paralysis. He was sixty-one years of age.

The tug Petrel, owned by the H. M. Loud's Sons Lumber Co. of Au Sable, Mich., has been sold to Philip Mago of Tonawanda, who will use her in the canal towing business.

The schooner Three Brothers was relaunched at Lorain last week. The January flood left her high and dry on the bank. She was first of all thoroughly overhauled and calked in her impromptu dock.

Capt. A. B. Wolvin of the Great Lakes & St. Lawrence River Transportation Co. announced that additional vessels will be chartered for their fleet for the coming season. Last year ten vessels were employed in this line.

The schooner E. B. Maxwell, engaged in the lumber trade between Chicago and the northern piers, has been sold by her owner, Capt. Ole Hansen of Milwaukee, to Lake Erie parties. The consideration is given as $4,800.

Owing to a misunderstanding three steamers of the International Salt Co. were temporarily tied up last week. It was believed by the Masters and Pilots association that they should carry second mates, but as they are under 700 tons burden, this was held to be an error. The steamers will carry only one mate.

The tug Frank Canfield, owned by the Canfield Tug Line, Manistee, Mich., ran aground on the outer bar at Point Sable and sank this week. Capt. Harry Smith, engineer, Charles Kopfer and William Justmann, helper, were drowned. The wreck was caused by the breaking of the tug's rudder chains while the hand tiller was being adjusted.

The Marinette Fuel & Dock Co. is installing on its dock a new hoisting plant. The outfit, consisting of tramways, steam engine, coal cars and derrick, was bought from the Milwaukee & Western Fuel Co. of Milwaukee. The new apparatus is expected to unload big cargoes from vessels in half the time taken by the old method. The Milwaukee company will install a $50,000 plant.

Maj. Dan C. Kingman, United States engineer with headquarters at Cleveland, has visited Lorain to inquire into damages done by the January storm. He will drive piling from the pier eastward at a point far enough out into the lake to entirely restore the original lake line. This work will be done immediately as the lake is washing over the land back of the piers and carrying sand into the mouth of the Black river.

The dock managers and the delegates from the International Longshoremen, Marine and Transport Workers' association concluded their conference in Cleveland last week and agreed upon a wage schedule for the coming season. The schedule is a compromise. The men agreed to accept a reduction of 7½ per cent and to work the usual day of eleven hours. The ore shovelers will be paid at the rate of 13 cents a ton, which is 1 cent a ton less than that received last year. No action has as yet been taken by the dock managers in regard to the unloading charges, but it is probable that the rate will be fixed at 19 cents a ton as against 21 cents for last year.

Capt. Frank Rae, whose refusal to join the Masters and Pilots' Association while master of the steamer Clemson last year was the cause of the strike of the mates on the steamers of the Steel Corporation last fall, has been admitted to membership in the association. When Capt. Rae was forced to relinquish his position as master of the Clemson by reason of the action of the association, Capt. Wolvin for purely personal reasons gave him an important position in the management of the Pittsburg Steamship Co. The association at that time assumed an attitude of extreme hostility to Capt. Rae, but has evidently repented upon second thought.

Judge Swan, in the United States district court at Detroit, has found the steamer Turret Court entirely to blame for the sinking of the steamer Waverly in Lake Huron off Sand Beach last July. A commissioner will decide the amount of damages. The Gilchrist Transportation Co., the owners of the lost boat, sued to recover $37,242. Car ferry No. 16 will enter the service between Conneaut and Port Stanley during the coming season. She has been fitted with a forward wheel to assist her in ice-breaking and will probably clear from Milwaukee for Conneaut in a few days. No. 16 was the last boat through the straits last fall and she is likely to be the first through this spring.

Judge Seaman of the United States district court at Milwaukee has decided the J. Emory Owen salvage suit. The Ann Arbor car ferry No. 22 was awarded $2,600 and the steamer George Burnham $1,300. The owners received two-thirds and the crew one-third. The shares of the crews, however, are further reduced by special awards to certain members of the crew, amounting to $360 in case of the car ferry and $130 in case of the Burnham. The Owen burned off Sturgeon Bay canal off Lake Michigan on Dec. 5 last. In deciding the case Judge Seaman scored the salvors, saying a spirit of selfishness and jealousy was evidenced, which was deplorable. Both the car ferry and the steamer, the court says, misconstrued the true spirit of the adventure and had the result been effected by their conduct he would have materially reduced the award.

The freighter Francis Widlar, building for the Columbia Steamship Co. of which Mr. Charles O. Jenkins of Cleveland is manager, was launched last week from the Cleveland yard of the American Ship Building Co. Miss Stella Wheeler of New York christened the steamer and those who saw her go into the water were: Mr. and Mrs. F. B. Squire, Mr. and Mrs. Francis Widlar, Mr. and Mrs. A. K. Spencer, Mr. and Mrs. E. P. Lenihan, Capt. and Mrs. R. E. Burdick, Mrs. W. S. Mack, Mrs. R. C. Rathbone, Miss Wheeler, Miss Stella Wheeler, Miss Squire, Miss Bingham, Miss Weitz, Miss Thomas, Miss Vincent, Mr. T. C. Prindiville, Mr. E. T. Bush, Mr. H. N. Harriman, Mr. George Eichelberger Mr. L. C. Jones, Capt. A. J. Greenley, Capt. Henry Peterson, Mr. J. C. Wallace, Mr. R. C. Wetmore and Mr. Charles O. Jenkins. The Widlar is 436 ft. over all, 416 ft. keel, 50 ft. beam and 28 ft. deep. She will have triple expansion engines, cylinders 22, 35 and 58 in., with 40-in. stroke. Steam will be furnished by two Scotch boilers to be fitted with the Ellis & Eaves draft.

A plan for the reorganization of the Fore River Ship & Engine Co., Quincy, Mass., has been agreed upon. It is proposed to issue $4,800,000 in stock, equally divided between common and preferred and to raise $1,250,000 of new money by assessing the bond holders 40 per cent and the old stock 33⅓ per cent. The bond holders will receive ten shares of new preferred and eight shares of new common stock for each bond, and the preferred stockholders will receive one share of the new preferred and one and one-half shares of new common stock for each three shares of old stock. Of the money thus realized $300,000 will be used to complete the plant, $400,000 to pay off the company's floating debt and $350,000 as a working capital.

Mr. George Westinghouse who went to Europe some little time ago with Rear Admiral George Wallace Melville, late engineer-in-chief of the United States navy, is arranging with the Parsons Steam Turbine Co. for the exclusive right to manufacture the Parsons' turbine in the United States for use in United States ships.

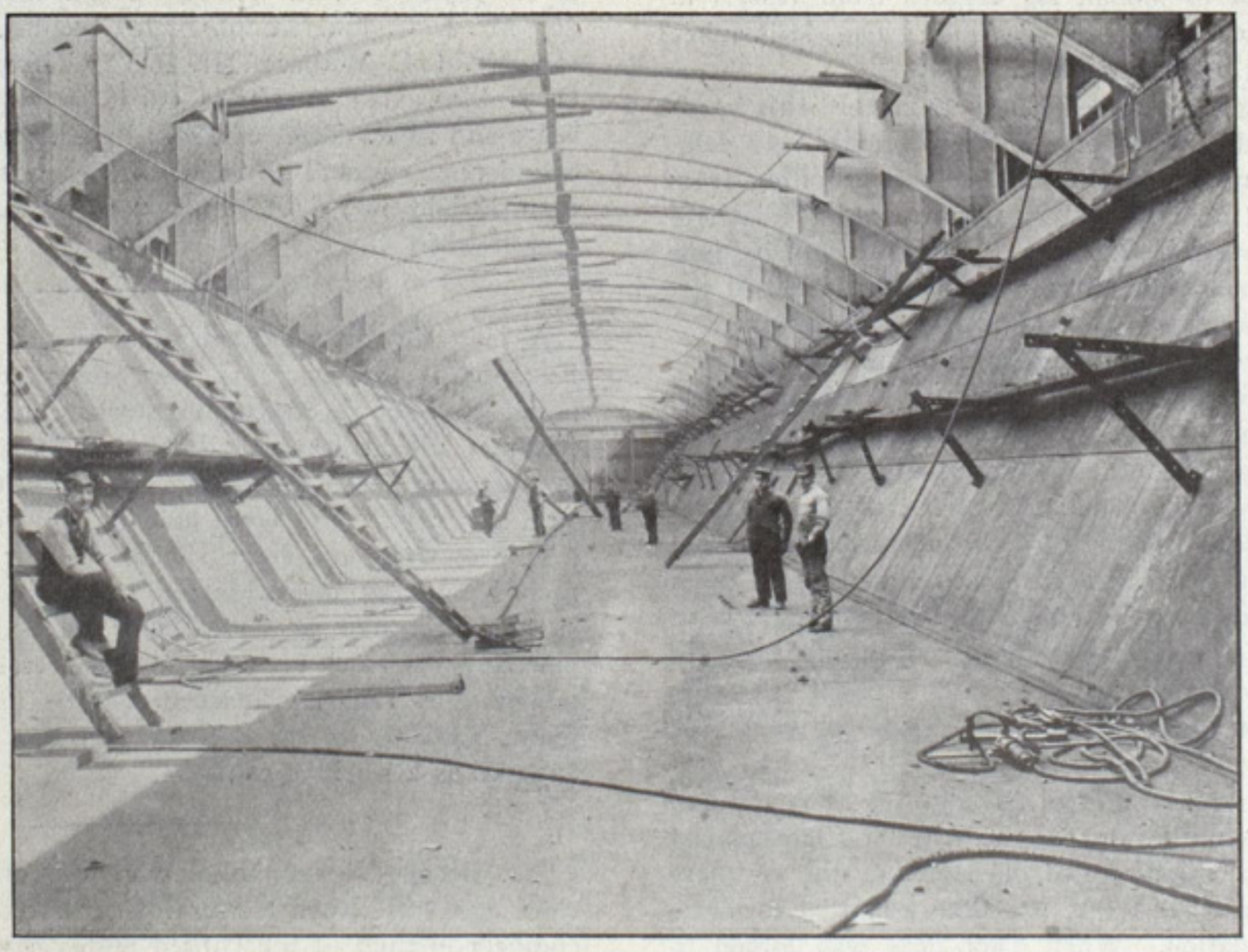
Launch of the Wolvin.

MRS. WOLVIN SMASHING THE BOTTLE.

Beautiful is the only word which adequately describes the launch of the steamer Augustus B. Wolvin at the Lorain yard of the American Ship Building Co. on Saturday last. The day was beautiful, the launch was beautiful, and the arrangements to the least detail were perfection themselves. It would be impossible to estimate the number of persons who saw the launch, but it would appear to the casual looker-on as though the whole world and his wife were present; for wherever one looked there was nothing to be observed but faces. Every point that had the slightest altitude was seized upon. Even the humblest shed bore its burden of human freight and as for the steamers like the Steinbrenner and others moored at the yard, it was impossible to see their decks for people. Assuredly the whole town of Lorain was out and a considerable part of the population of Cleveland.

The arrangements for transporting the guests of the American Ship Building Co. from Cleveland to Lorain were entirely comprehensive and no confusion whatever resulted from the operation of a special train of cars along the electric railway. As the cars came in proximity to the ship yard, the big yellow side of the Wolvin loomed plainly into view, and with the quick though somewhat irreverential wit which is characteristic of the American mind, the steamer was very promptly dubbed the "Yellow Kid." She certainly was yellow; there was no doubt about that; a brilliant, flaming yellow, verging to orange, which made her as conspicuous as a conflagration on a dark night. Her bottom is green, a bright green that would in itself have been conspicuous had it not been entirely dominated by the saffron sides of the leviathan. Flags streamed from stem to stern and were given life and action by the wind that blew steadily throughout the day.

It was when the supreme moment came to launch the vessel that the arrangements proved to be masterful in their perfection. The transfer of 5,000 tons dead weight from the launching ways into the water is always an anxious moment for the ship builder, but the face of Mr. James C. Wallace, general manager of the company, remained as placid as though he had no care in the world. From the time the signal was given to cut the ropes until she was actually in the water was only a few seconds, and she settled upon an even keel with scarcely any rolling whatever. It was said to be the most successful and satisfactory launch that the American Ship Building Co. has ever had. The launch was under the direction of Mr. Frank La Marche, manager of the yard, but the actual details of the launching were directly supervised by Mr. O. N. Steele. The operation of sending the steamer in the water seemed so simple that there was no evidence whatever of the great labor involved and eastern ship builders who were present expressed their amazement at it. All the keel blocks had been removed with the exception of five at either end. At a signal these ten blocks were knocked out and the steamer was then held by four dog shores or triggers at each end, which in turn were held by ropes. Men stood at these ropes with uplifted axes and at a given sign severed them. The tug Frank W. began to pull at a hawser attached to the bow and a moment later the Wolvin was in the water. Her stern started first, but when she got to the water she practically struck it on an even keel. Mr. H. G. Mull, the general manager of Cramp's ship yard, who witnessed the operation, expressed his astonishment over and over again at the simplicity of the operation, saying that on the coast instead of ten blocks to be knocked out, there would be ten times ten. He added that the lake ship yards have learned how to minimize the danger of launching.



CARGO HOLD OF THE WOLVIN.

Such is usually the agitation of the person selected to name a vessel that she totally forgets the all-important words in her excitement and

even fails to break the bottle. Mrs. A. B. Wolvin, however, who christened the Augustus B. Wolvin, named after her husband, failed in neither particular. When Mrs. James C. Wallace, wife of the vice president and general manager of the American Ship Building Co., signaled to the men to cut the ropes that were holding the ship, Mrs. Wolvin exclaimed just as the vessel started down the ways: "I christen thee Augustus B. Wolvin," and the photograph which leads the present article testifies on the thoroughness with which she cracked the bottle of champagne. Others who were in the immediate vicinity can also testify. The bottle was a two-quart bottle and in its effervescence resembled a small-sized deluge.

As the steamer struck the water cannons boomed, whistles shrieked and thousands upon thousands of people yelled themselves hoarse. Those on the launching stand were: Capt. and Mrs. A. B. Wolvin of Duluth, Mr. and Mrs. J. C. Wallace, Mr. Robt. Wallace of Cleveland, Mr. and Mrs. Chas. M. Schwab, Mr. and Mrs. M. R. Ward, Dr. and Mrs. S. A. Brown, Mr. J. A. Schwab, Mr. J. C. Niven, Mr. J. H. Ward, Miss Schrubbe, Mrs. Bierwerth, Mr. C. Mercorder of New York, Mr. John R. McGinley of Pittsburg, Mr. W. O. Duntley, Mr. J. W. Duntley of Chicago, Mr. A. W. Thompson of Chicago, president of the Republic Iron & Steel Co.; Mr. S. T. Wellman of Cleveland, Mr. C. W. Andrews of Duluth, Mr. Jos. Boyer of Detroit, Mr. H. G. Mull of Philadelphia, Mrs. W. H. Becker, Willie Becker, Mr. J. H. Hoyt, Mr. R. L. Ireland of Cleveland, Capt. and Mrs. D. Sullivan of Chicago, Mr. Martin Mullen, Mrs. and Mrs. R. B. Wallace, Miss Alice Moore, Miss Irene Smith, Miss Zoah Mitchell, Miss Alice Walsh, Miss Stella Van Pelt, Mr. W. H. McGean, Mr. Ralph Mitchell, Mr. and Mrs. Charles E. Kennedy, Miss Winnifred Kennedy, J. H. Sheadle, George V. Callahan, Robert Logan, all of Cleveland; Frank Kirby, C. B. Calder, George Crosswillow of Detroit, A. H. Hawgood, Capt. A. J. Greenley, Capt. George P. McKay, Capt. Edward Morton, Fred Jackson, H. A. Hawgood, M. A. Bradley, John Wedow, James McGrath, Capt. George L. Dewolf, W. A. Hawgood of Cleveland, William Livingstone of Detroit, Capt. Alfred Mitchell, Capt. W. W. Smith, Capt. Henry Stone, Capt. George Mallory of Cleveland, Capt. Frank Root of Chicago, J. J. H. Brown, G. W. Maytham, Edward Smith, M. M. Drake of Buffalo, J. C. Gilchrist, Capt. H. L. Weeks, Capt. James Stone, E. C. Collins, H. R. Edwards, Capt. James Lowe, Capt. C. E. Benham, Capt. and Mrs. Charles Motley, John B. Cowle, W. B. Davock, Capt. Frank Brown, A. F. Harvey, John Corrigan, Joseph Hayes of Cleveland, Joseph Kidd of Duluth, Thomas Prindeville of Chicago, William Prime of New York, H. S. Wilkinson of Syracuse and D. T. Helm of Duluth.

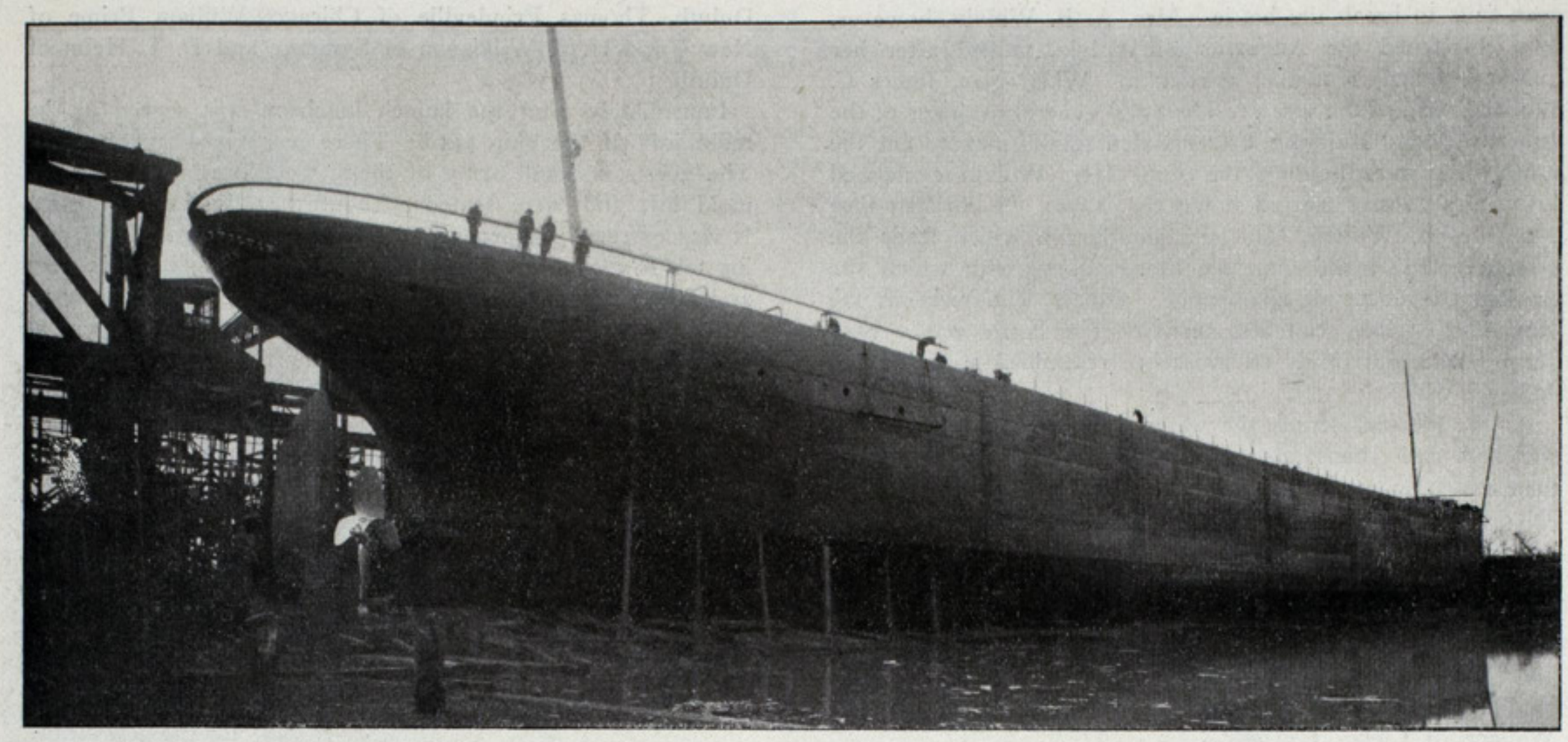
DECK VIEW OF THE WOLVIN SHOWING HATCHES.

Immediately after the launch luncheon was served in the mold loft of the ship yard. There was no delay about it. The guests, a small army of them, went immediately to the mold loft and were seated without the slightest confusion. It was extremely appropriate that the decorations of the dining tables should have been daffodils combining in their stem and flower the two colors with which the boat was painted. After the discussion of a luncheon of chicken salad and champagne everyone was quite prepared for the flow of soul that followed. It is the merest repetition to dilate upon the merits of Mr. James H. Hoyt as toastmaster. He is unrivaled in this special province. He spoke briefly of the Augustus B. Wolvin as representing the greatest progress in ship building on the lakes and paid a very earnest tribute to Mr. Wolvin. He predicted the utmost success for the new steamer for two reasons—the first that she must be an economical carrier and the second that she was christened by Mrs. A. B. Wolvin. As corroborative evidence for this latter reason he pointed to the steamer James H. Hoyt, which was christened by Mrs. Wolvin and which has achieved the enviable record of being the biggest money-maker on the lakes. He then introduced Mr. Wolvin to the audience.

Mr. Wolvin said that the great growth of lake navigation was to be attributed first of all to the aids to navigation which had been generously bestowed by the federal government and then to the constructive ingenuity of the ship builders of the great lakes. He claimed no special credit for the design of the Augustus B. Wolvin, adding that Jimmy Wallace wanted to build the boat and that he had never been able to keep up with the ideas of Jimmy Wallace. He was of the opinion that one of these days Mr. Wallace would build a structure long enough to reach from Escanaba to the Lake Erie docks and run the ore down on trolleys.

"I perceive," said Toastmaster Hoyt, "Jim Wallace beginning to look very unhappy," and with this gentle notification that Mr. Wallace was to be the next speaker, he proceeded to eulogize that gentleman somewhat.

As soon as Mr. Wallace got upon his feet he admitted in the preface that he was scared to death, a confession which completely won the sympathy of the audience and which at the same time apparently put him entirely at his ease, for he proceeded to make a very good speech indeed. He disclaimed any credit whatever for the new steamer. He claimed that Mr. Wolvin wanted to build the boat and got together the



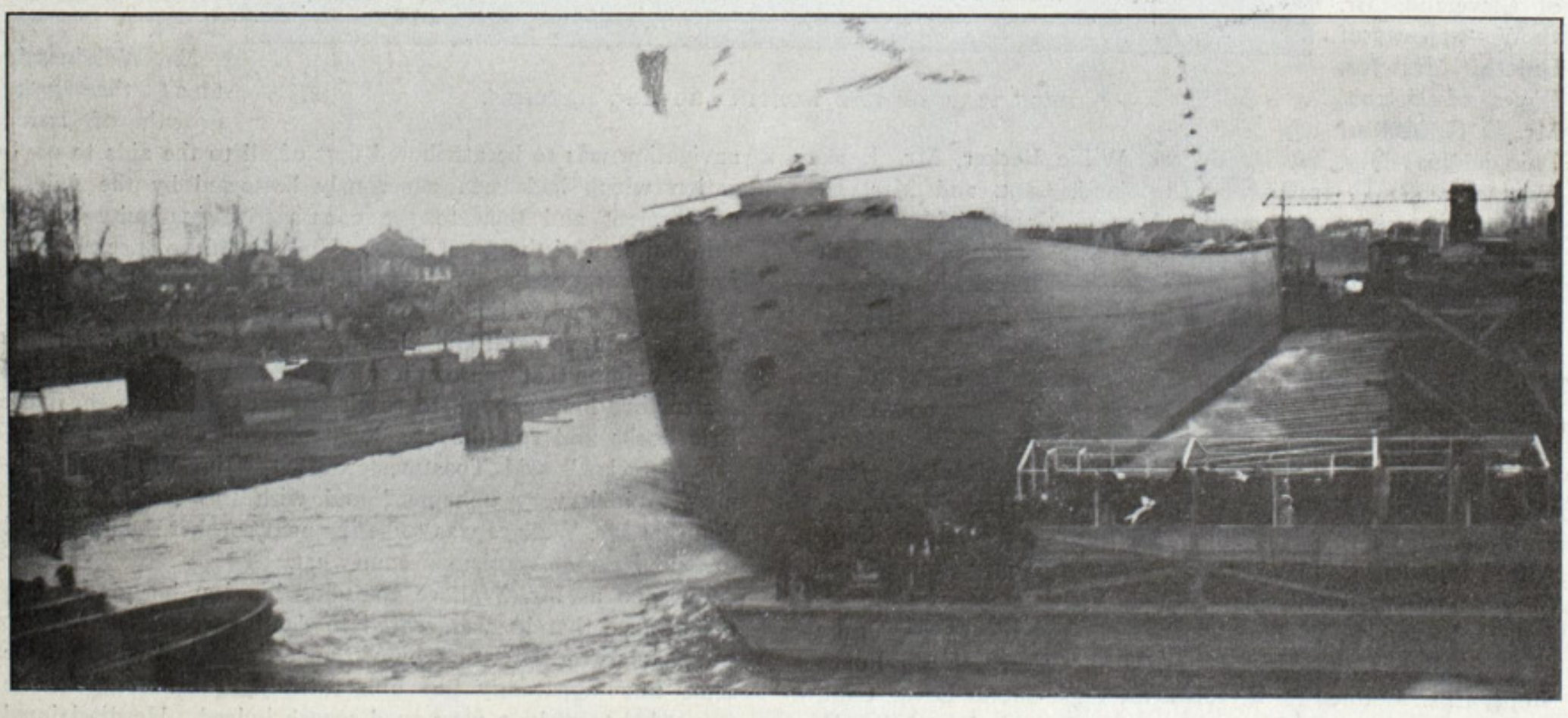
THE AUGUSTUS B. WOLVIN ON THE STOCKS.

money to build her. He predicted, however, that the new steamer would work a great revolution in the transportation business of the lakes and declared her to be as much in advance of the 5,000-ton steamer as the 5,000-ton steamer is in advance of the old wooden boat. He believed the Augustus B. Wolvin to be in every respect the finest ship on the great lakes.

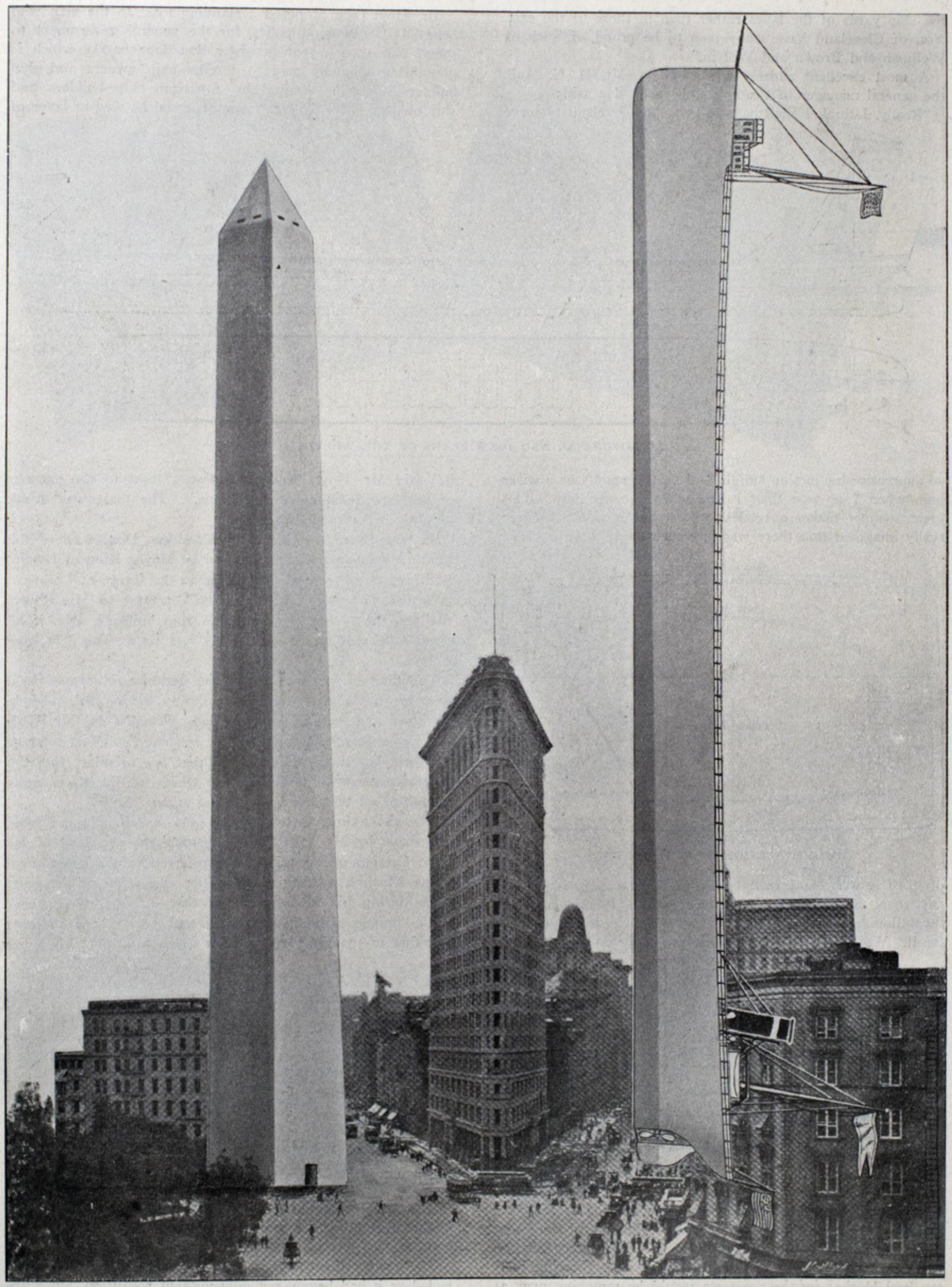
Of course, great interest was centered in Mr. Charles M. Schwab, ex-president of the United States Steel Corporation, and when it became apparent that Mr. Hoyt was to present him next everyone was on the *qui vive*. Mr. Hoyt referred to him as the greatest steel-maker of the age.

Mr. Schwab's manner was instantly impressive. He was easy, masterful, capacious and many-sided. The occasion, he said, was one of such enthusiasm that he regretted it was not a meeting of the stockholders of the Acme Steamship Co., which was building the boat. He added that whenever he heard such introductions as the toastmaster had just given him he was inclined to believe that he was some such person after all, but circumstances always intervened to bring him back to his proper level. As an illustration of this he told the following story: One day he was driving from the works with his colored boy Bob when they met on the road a workman's wife with her little daughter. The woman said, "Look, Elsie, quick, that's Mr. Schwab." The child gave an eager and searching glance at the buggy and said "Which one mamma?" Mr. Schwab then gave a brief eulogy of Capt. Wolvin and appreciated greatly what he had done for the greatest industry in the world. He declared that the men of the great lakes had reduced the cost of the raw material in the manufacture of steel 60 per cent in his day and had made possible the great development of the iron business in Pittsburg and the valleys.

"I don't think that in Cleveland," said Mr. Schwab, "you appreciate Capt. Wolvin one-half as much as we do in New York, where we do things pretty well, or in Pittsburg, where we do things better. Capt. Wolvin has done what certainly we have not been able to do in New York of late—that is to raise the wind, and I regret that those who latterly guided my dollars did not put them under Mr. Wolvin's control in



LAUNCH OF THE AUGUSTUS B. WOLVIN.

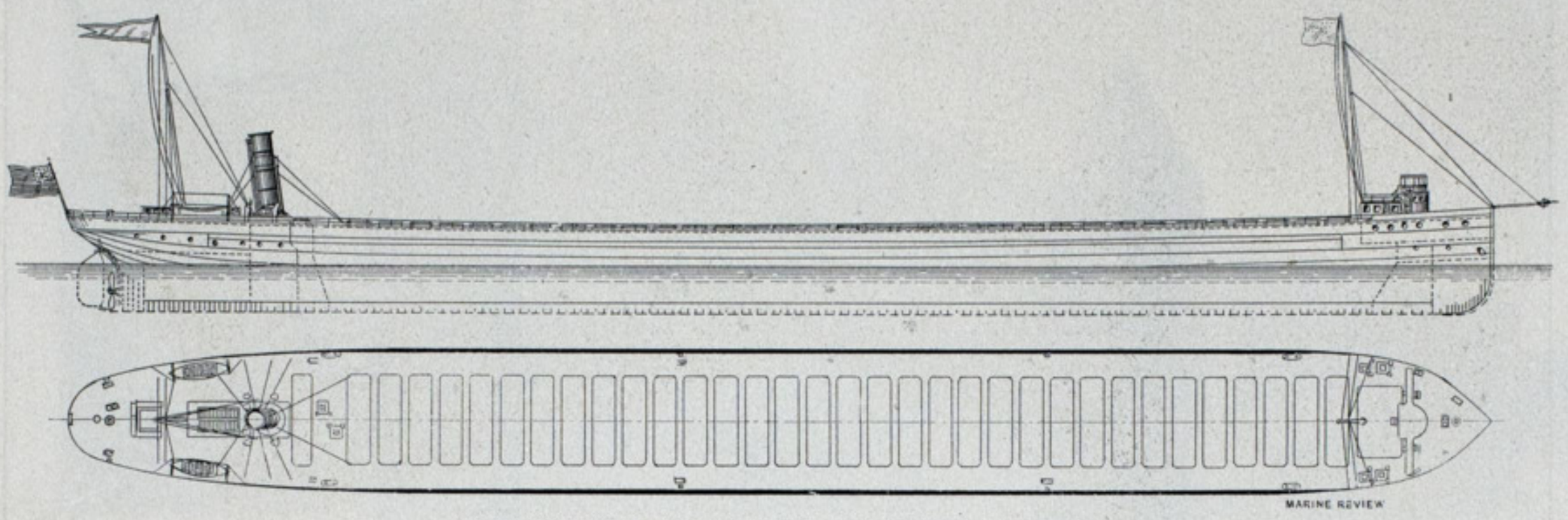


HOW THE AUGUSTUS B. WOLVIN WOULD LOOK IF STACKED UP AGAINST THE FLATIRON BUILDING IN NEW YORK OR THE WASHINGTON MONUMENT. THE WOLVIN IS 560 FT. LONG, THE WASHINGTON MONUMENT 550 FT. HIGH AND THE FLATIRON BUILDING 286 FT. HIGH.

the ship yards of the lakes rather than in those of the east. You of Cleveland have many men to be proud of, such as Wellman and Brown and Wolvin."

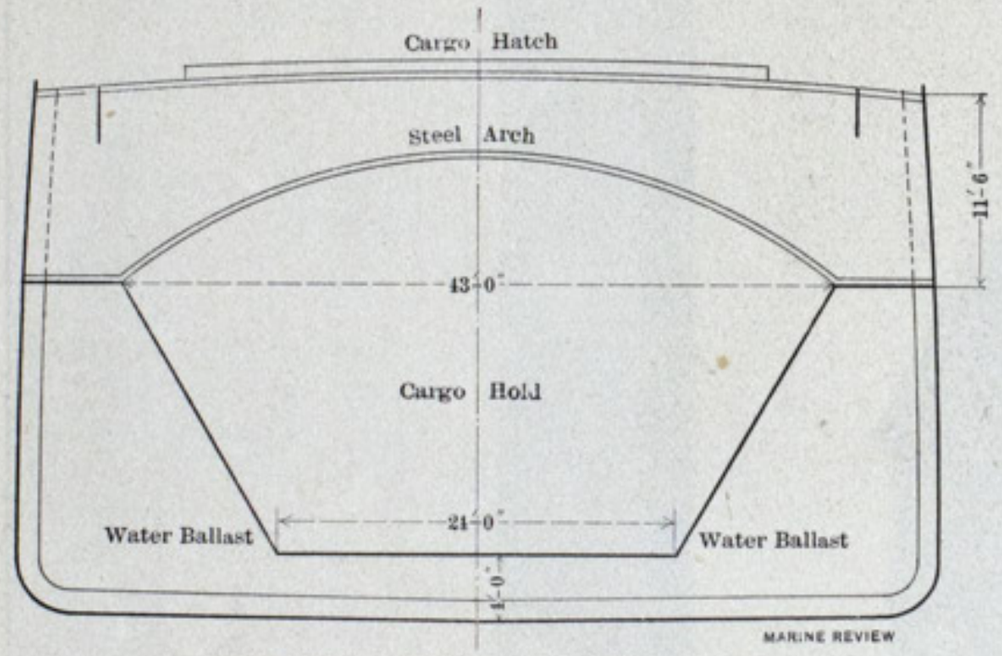
A most excellent address was made by Mr. H. G. Mull, the general manager of Cramp's ship yard. He said:

"Really, I think I shall have to come to Cleveland to serve



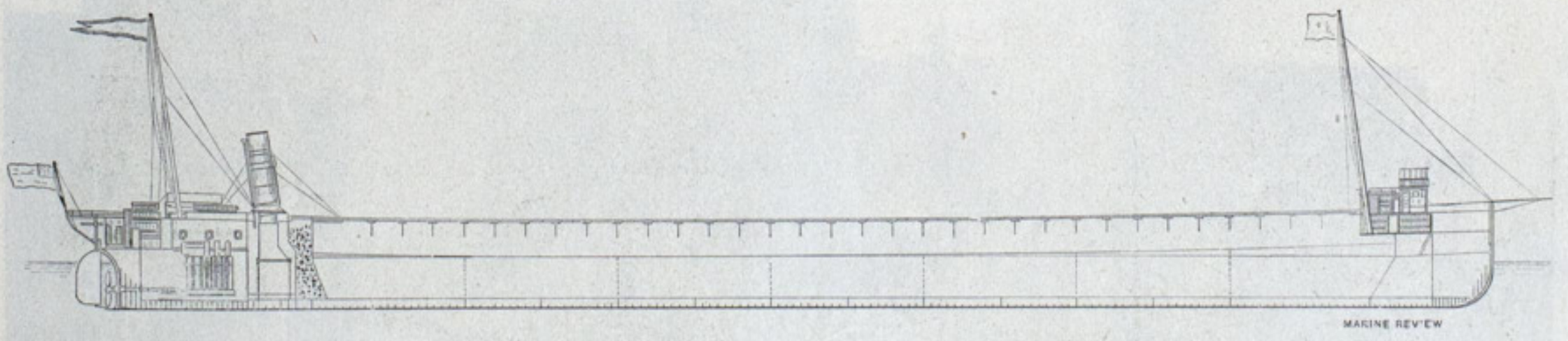
LONGITUDINAL AND DECK PLANS OF THE WOLVIN.

an apprenticeship in ship building. I shall certainly be a wiser man when I go east than I was when I came here. This great steamer makes a battleship look like a skiff. I never really imagined that there was any such ship. I have heard



MIDSHIP SECTION OF THE WOLVIN.

of it, of course, but I really could not believe that there was any such thing. Such a structure as this is calculated to revolutionize ship building, and Capt. Wolvin is responsible for it. We have not been building profitably on the coast of



INBOARD PROFILE OF THE WOLVIN.

late. Actually I begin to believe we know nothing there. Mr. Wallace asked me this morning what I thought of the ship, and I told him I was not thinking. When I get home I'll begin to think. I saw a few men a little while ago removing just ten keel blocks; on the coast we would be removing over a hundred and thus magnifying the element of danger. I have learned many many things today. This has surpassed anything I have ever seen in my life before."

Mr. Hoyt then proposed a standing toast to the man who believed it was good policy for the general government to spend $9,000,000 a year in order that $200,000,000, which is now being annually paid to foreign ship owners and ship builders might be secured by American ship builders and ship owners. "He lived in favor of it and he died in favor of it," said Mr. Hoyt, "and I propose a toast to the memory of the late Senator M. A. Hanna," The toast was drunk standing by every one present.

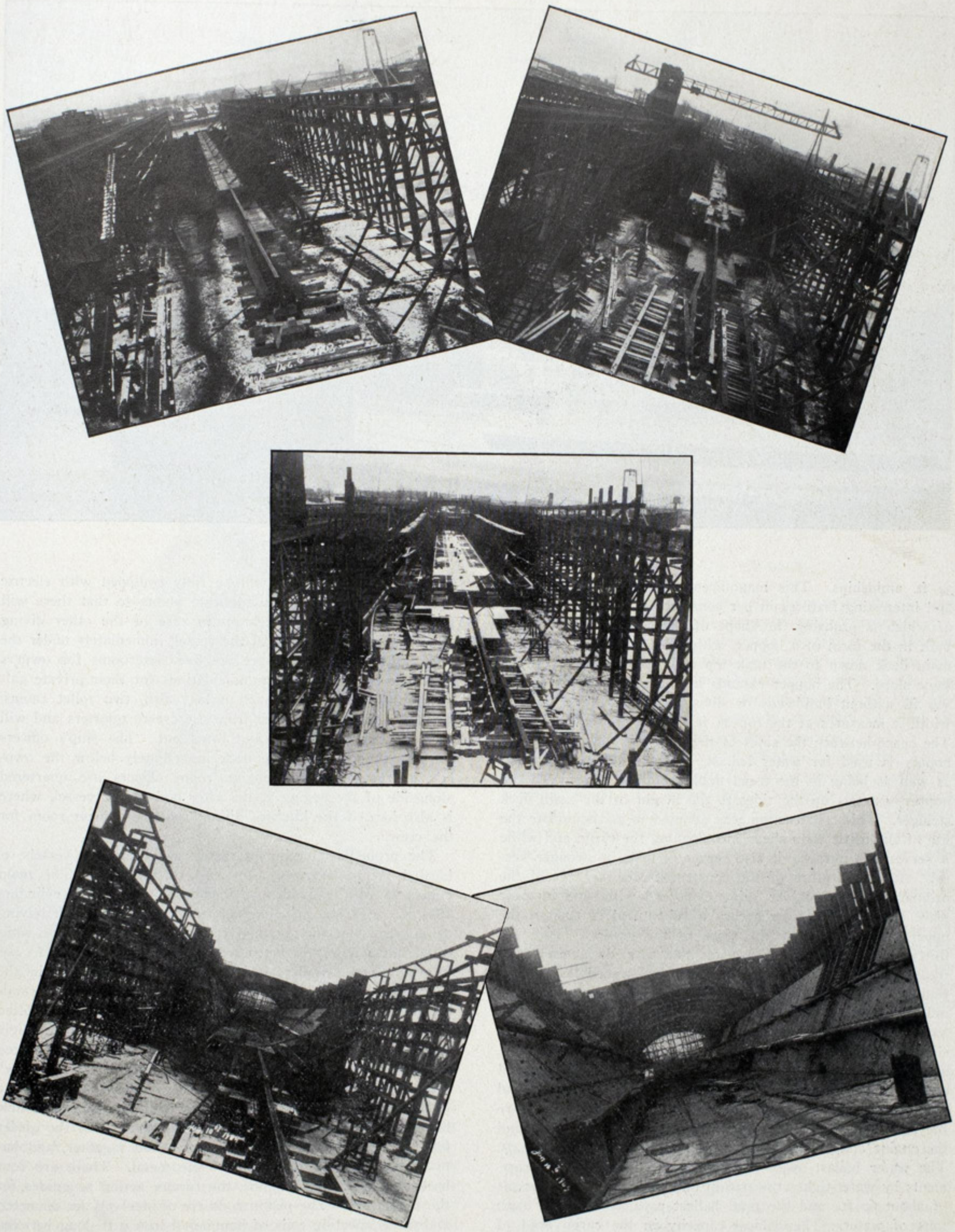
Speeches were then made by President Donaldson of the Lorain Chamber of Commerce and by Mayor King of Lorain. Both expressed their abiding belief in the future of Lorain.

"I now propose," said Mr. Hoyt, "a toast to Mr. Robert Wallace, the nestor of great lakes ship builders, who, if he won't talk, will please get on his feet so we can just look at him."

Thunders of applause shook the building, everyone stood upon his feet and it was some minutes before the audience sat down and the applause subsided. When it did Mr. Wallace was observed standing alone. He made no effort to make a speech, but simply referred to "that boy of mine, Jim, the general manager," but the way in which he did it was quite enough to set the audience cheering again.

The concluding speech, and a very excellent one it was, was made by Mr. William Livingstone, the president of the Lake Carriers' Association. He referred to the great revolution which had taken place in the navigation of the great lakes during his lifetime, saying that in 1863 93 per cent of the tonnage of the lakes was sail and 7 per cent was steam; and that in 1904 97 per cent of it was steam and only 3 per cent sail. He thought that anyone would be venturesome to predict the ultimate reaches of lake commerce and lake ship building.

The guests then took cars for Cleveland and the affair ended as it had begun, not only without confusion, but without the slightest indication of hurry and rush. A great vessel had been launched, a great banquet served and a great number of people transported to and from town without the

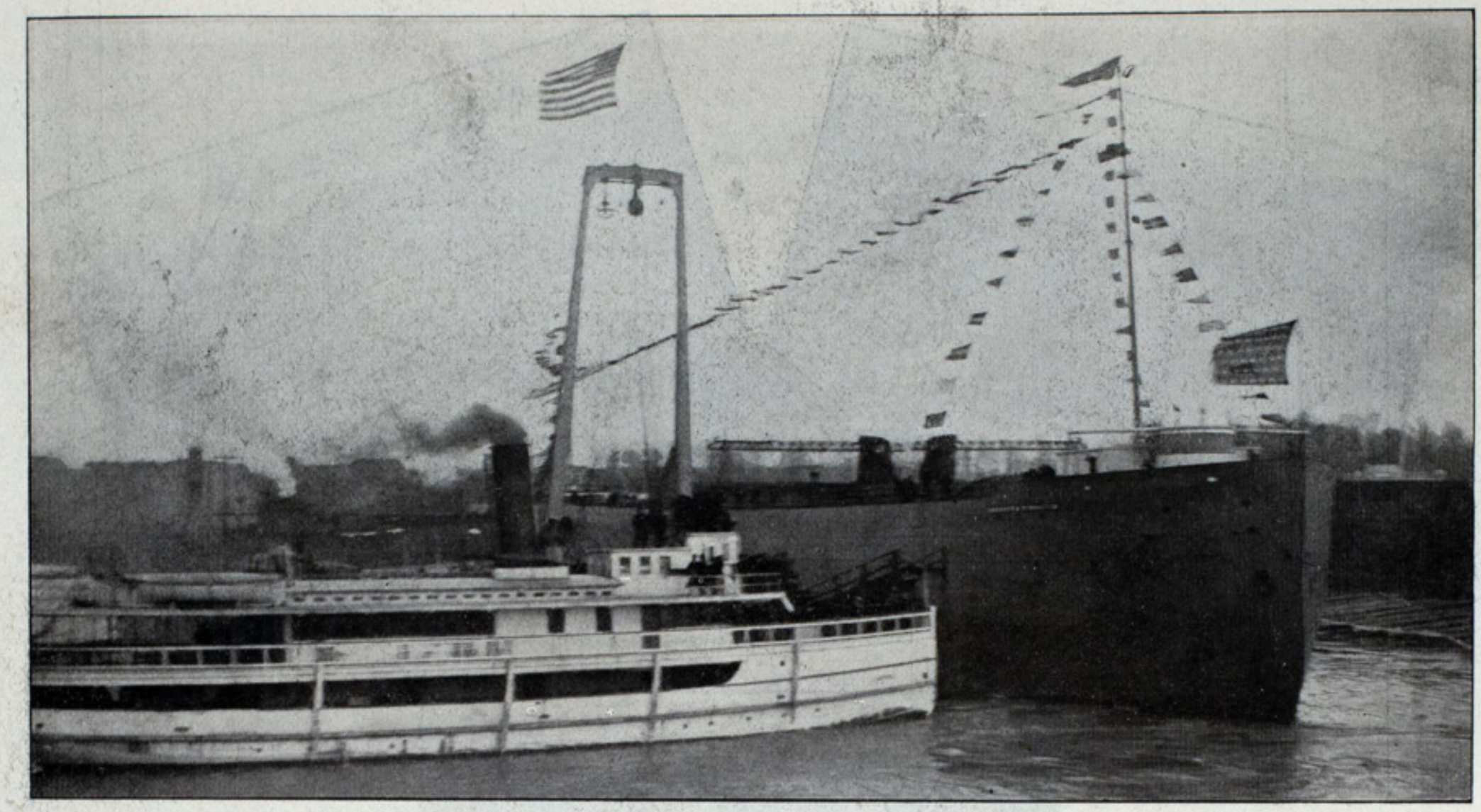


VIEWS TAKEN SHOWING VARIOUS STAGES OF CONSTRUCTION OF THE WOLVIN FROM DEC. 6, 1903, TO JAN. 10, 1904.

slightest friction. Nothing happened anywhere to mar the perfection of the day.

DESCRIPTION OF THE STEAMER.

This vessel is the largest ever built anywhere to navigate fresh water and there are very few ocean vessels that are purely freight vessels that exceed her in dimensions, her length being 560 ft. over all, 540 ft on keel, with a beam molded of 56 ft. at the widest part, and a molded depth of



THE AUGUSTUS B. WOLVIN SETTLED ON AN EVEN KEEL.

32 ft. amidships. This magnificent vessel has several new and interesting features in her construction, the principal one of which is probably the shape of the cargo hold. This is built in the form of a hopper, with sides that slope from the main deck down to the tank top and the ends built on the same slope. The hopper extends in one continuous length of 409 ft. without bulkheads or divisions of any kind, and in width it measures at the top 43 ft., and at the bottom 24 ft. The space between the sides of the ship and the sides of the hopper is used for water ballast, so that the water ballast, as well as being in the usual double bottom underneath the hopper, extends up the sides to the height of the main deck stringer. This construction was adopted to accommodate the use of automatic clam shells in unloading the cargo and while it serves this purpose, it also serves to make a stronger vessel. Another feature of the construction is the fact of the ordinary hold stanchions being dispensed with, and in their place a system of girder arches is substituted to support the upper deck as well as the sides of the vessel. There are thirty-three cargo hatchways on the spar deck, each one measuring 33 ft. by 9 ft. in the clear, and spaced 12 ft. apart centers, so that it will be possible for the clam shells to unload the vessel entirely without any hand shoveling. These hatchways are fitted with a patented system of steel plate sliding hatch covers, operated by steam engines and shafting, so that no manual labor is required for the opening and closing of the hatch covers. The spar deck is continuous and flush from stem to stern, and the only erections on it are the pilot house and texas forward, and the coamings around the engine and boiler openings and dining room skylight aft. The water ballast space is divided into numerous compartments by water-tight athwartship bulkheads fitted at intervals of about 60 ft., and the total ballast capacity is about 8,000 tons of water. The cubical capacity in the cargo hold of this immense vessel is about 500,000 cubic feet, which is equal to 401,000 bushels of grain, or to 12,500 tons of coal. On the spar deck are six 8 x 10 inch single drum engines, carrying each a steel wire mooring line for the usual mooring and warping purposes. In fact, steam has been used wherever possible to displace manual labor. There is a steam windlass fitted for handling the two 8,000-pound anchors, and a steam capstan on the spar deck aft. She will be fully equipped with electric lights throughout and has duplicate plants so that there will always be one to fall back on in case of the other giving out. In the forward end of the vessel, immediately under the pilot house and texas, there are five staterooms for owners and their families, also accommodations for their private galley, dining room and social parlor; also, two toilet rooms. They are entirely set apart from the crew's quarters and will be luxuriously furnished and fitted out. The ship's officers are accommodated on the deck immediately below the owner's quarters, and the engine room officers are quartered alongside of the engine at the after end of the vessel, where is also located the kitchen, dining room and mess room for the crew.

The propelling machinery, as is usual in lake vessels, is located in the extreme after end of the boat. The main engine is of the quadruple four-crank type, with cylinders 18½ in., 28½ in., 43½ in. and 66 in. diameter, each having 42 in. stroke of pistons, and they are designed for an indicated horse power of 2,000 when making 80 revolutions per minute. The cylinders are arranged from forward in the following order: High-pressure, first-intermediate, second-intermediate and low-pressure. The high-pressure is fitted with a liner secured in the usual way. The valves of the high, first and second intermediate are of the piston type, placed in front of their respective cylinders, and driven by "Joy" radial valve gear. The low-pressure cylinder is fitted with a double-ported slide valve on the after end, operated by double bar Stephenson link motion. The bed-plate is of the girder type, of box section, in two pieces, bolted together, and has five main bearings lined with white metal. There are four back and five front columns, the former acting as guides for the crossheads. The piston rods are of steel 5⅜ in. diameter, and the connecting rods of hammered iron 9 ft. long between centers, with wedge adjustment at top, and "T" ends with bolts at bottom. The crossheads are of cast steel, keyed to piston rods and fitted with steel crosshead pins, secured with double taper and nut. The slippers are of bronze of large surface and easily adjustable. The crank shaft which, with its four cranks is built without couplings, is 12½ in. diameter. The crank pins are each 12½ in. diameter by 13½ in. long.

The thrust is of the "horseshoe" type with six go-ahead collars and five backing. The engine is fitted with a direct-acting steam, and a hand, worm reversing gear, also a steam turning gear at aft end of thrust shaft. The propeller is four-bladed cast steel, of sectional type. The outboard bearing is 13 in. diameter by 4 ft. 8 in. long, filled with lignum vitae.

The boilers, two in number, are of the Babcock & Wilcox type, and placed with a 12-ft. space between them to fire athwartships. The working pressure is 250 lbs. per square inch, and the steam is superheated, the superheater being placed on top of boiler proper. The boilers are fitted with the mechanical stoker built by the Duluth Stoker Co., the coal being fed into hoppers, passing from thence on to traveling grates, the ashes being deposited at the back of boilers and

MRS. A. B. WOLVIN.

discharged overboard by means of steam-driven elevators. The boilers are fitted with a system of induced draft, having two 7 ft. 6 in. diameter fans driven by double 6 x 5 in. high-speed engines. To purify and heat the feed water before reaching the boilers, two Learmonth purifiers are fitted, also a large heater into which all the auxiliaries exhaust. There are the following auxiliaries in the engine room: The pumps, all being of the Blake type; one vertical cross compound simplex air pump; two horizontal cross compound simplex ballast pumps; one horizontal compound duplex feed pump; one horizontal duplex pony pump; one horizontal duplex bilge pump; one horizontal duplex cooler pump; two general electric generating sets of 15 K. W. for electric lighting. One "Globe" steam steerer, and one "Sturtevant" fan with attached engine for ventilating purposes.

The coal bunker is fitted in front of the boiler room and has capacity for about 350 tons of coal. In every respect the vessel has been fitted out and built to meet the most modern

MRS. J. C. WALLACE.

requirements of the lake service, and there is not the slightest doubt but what she will fulfil every anticipation made of her.

To the foresight, skill and ability of Mr. A. B. Wolvin, for whom this vessel is named, is due the credit of her having been built for the Acme Steamship Co., and to Mr. Jas. C. Wallace, vice-president and general manager of The American Ship Building Co., and his associates, is due the credit for the design of the general structure.

It is the intention of Mr. J. C. Wallace to have the Wolvin establish the record cargoes for the great lakes during the coming season. He wants her to establish the ore record, the coal record (both hard and soft) and the grain record. She has already been chartered for her first trip. Her initial trip will be to take 12,500 tons of coal from Lorain to the head of the lakes, which will, of course, be by far the largest cargo ever carried on fresh water. The cargo will be furnished by A. C. Saunders & Co. of Cleveland. The steamer, of course, possesses in herself unusual facilities for both loading and unloading, but it is intended to give her as well on this first trip the utmost dispatch, in order that both loading and unloading records may be established. The master of the steamer has not yet been appointed, but Mr. Andrew Hass will be her chief engineer.

The list of guests invited to the launch was as follows:

Chas. Roe, Detroit; John Reis, Newcastle, Pa.; Jno. R. McGinley, Pittsburg; W. S. Woodrow, New York; Chas. Mallory, New York; Alex. W. Thompson, Chicago; W. B. Albright, New York; W. E. Reis, New York; W. H. Newman, New York; W. C. Farrington, New York; J. W. Duntley, Chicago; R. B. Schwerin, New York; Com. M. B. Mills, Detroit; Mr. and Mrs. F. B. Squire, Mr. and Mrs. F. Widlar, Walter R. Gilbert, E. T. Bush, H. R. Davock, John C. Fitzpatrick, J. D. Mitchell, Alex. Hynd, Jas. Naccy, F. D. Herrman, Chas. E. Kennedy, E. B. Lilley, Geo. Callahan, Geo. Rauschert, F. J. Hicks, Ed Allen, Jno. E. Morrison, Fred Goosman, S. G. Lytle, A. H. Bailey, F. H. Glidden, all of Cleveland; Gordon Mather, Canton; Fred Nicholas, Unionville, Ohio; Geo. D. Nicholas, Elyria; C. E. Squires, Cleveland; Ben. Sillman, Cleveland; H. N. Branley, Erie;

J. Baker, Erie; Henry Beckman, Erie; Jas. Walsh, Cleveland; Thos. Fleming, Cleveland; S. S. Walker, Chicago; Geo. Arnold, Cleveland; F. W. Smith, Milwaukee; A. M. Joys, Milwaukee; Ed. Uhrig, Milwaukee; Jos. Davidson, Milwaukee; John Benning, Milwaukee; Wm. H. Myers, Milwaukee; T. W. Sheriffs, Milwaukee; A. T. Kinney, Cleveland; F. A. Arter, Cleveland; A. B. Hambleton, Cleveland; Simon Levis, St. Louis; J. M. Wyman, Cleveland; P. J. Flickinger, Cleveland; Clarence Walker, Cleveland; W. D. Sandrock, Buffalo; F. G. Meyers, Buffalo; Chas. La Marche, Cleveland; John Weisbeck, Buffalo; Louis Lautenslager, Buffalo; Frank Elder, Buffalo; F. E. Kellog, Buffalo; B. Crowell, M. E. Farr, Miss Sally F. Hennan, S. Muehlhausler, Jos. E. Ball, F. G. Rodgers, W. J. Farassey, C. E. Richardson, John Thompson, Frank Wright, Capt. Wm. Hill, Chas. Pratt, Hugh Buckley, Chief F. F. Kohler, Chas. W. Scofield, all of Cleveland; Ed. Gaskin, Buffalo; Wm. E. Dempster; Buffalo; G. W. Maytham, Buffalo; Thos. Adams, Detroit; Chas. Bryschlag, St. Clair; O. P. Letchworth, Buffalo; W. A. Sydon, Chicago; S. R. Boynton, Mackinac City; W. R. Burt, Saginaw; G. S. Douglass, Buffalo; Graham & Morton, Benton Harbor; J. E. Mills, Port Huron; Goodrich Transportation Co., Chicago; Chas. W. Kotchee, Detroit; O. W. Blodgett, Bay City; Geo. W. Matham, Buffalo; Alvin Neal, Port Huron; S. C. Waldo, Detroit; C. W. Elphicke, Chicago; Wm. Dulac, Mt. Clemens; W. F. Carroll, Chicago; G. A. Tomlinson, Duluth; F. B. Case, Norwalk; W. S. Brainard, Toledo; M. M. Drake, Buffalo; Wm. H. Meyer, Milwaukee; C. A. Eddy, Bay City; Henry Wineman, Jr., Detroit; James F. Gallagher, Michigan City; C. F. Bielman, Detroit; F. W. Gilchrist, Alpena; John J. Boland, Buffalo; Wm. Donaldson, Buffalo; Henry J. Panly, Milwaukee; A. R. Sinclair, Duluth; John Duncan, Green Bay; John F. Eddy, Bay City; Geo. Farrell, Detroit; David Vance, Milwaukee; F. S. Vance, Milwaukee; J. G. Keith & Co., Chicago; John C. Pringle, St. Clair; John Green, Buffalo; N. P. Bigelow, Chicago; Timothy Hurley, Detroit; G. A. Tripp, Chicago; H. B. Ledyard, Detroit; J. C. Maclay, Buffalo; Simon Sangall, St. Clair; M. J. Cummings, Oswego; E. J. Crosby, Milwaukee; John B. Hall, Buffalo; M. H. Taylor, Erie, Pa.; John Prindiville, Chicago; Peter Reiss, Sheboygan; Wm. J. Gray, Detroit; A. M. Becker, Milwaukee; Wm. Livingston, Jr., Detroit; A. W. Colton, Toledo; J. S. Crosthwaite, Buffalo; F. T. Bently, Chicago; Nelson Mills, Marysville; C. T. Morley, Marine City; Lawrence M. Morley, Rochester; J. O. Teagan, Detroit; John Flynn, Duluth; Henry W. Watson, Buffalo; C. A. Chamberlain, Detroit; Geo. W. Black, Detroit; W. H. Singer, Duluth; F. B. Chesbrough, Emerson, Mich.; H. W. McCormick, Bay City; S. C. Waldo, Detroit; J. E. Ball, Buffalo; Thos. Adams, Detroit; W. J. Rardon, Chicago; H. C. French, Buffalo; J. M. Spence, E. Cleveland; J. A. Calbick, Chicago; A. C. Jones, Duluth; James McBrirr, Erie, Pa.; A. E. Stewart, Detroit; A. A. Parker, Detroit; Edward Mehl, Erie, Pa.; P. P. Miller, Buffalo; A. G. Tame, Cleveland; Fred Fuller, Cleveland; D. H. E. Jones, New York; Jas. Kenealy, Geo. Hall, Ogdensburg; J. H. Hoyt, H. A. Kelly, A. C. Dustin, J. A. Cotrell, H. H. McKeehan, G. Von Den Steinen, Wm. P. Murray, Sam. Mather, H. G. Dalton, E. P. Williams, Wm. McLaughlin, G. A. Garrettson, Geo. A. Russell, E. H. Bourne, E. R. Fancher, M. H. Wilson, E. G. Tillotson, Calvary Morris, C. O. Patch, John Sherwin, J. R. Kraus, C. E. Farnsworth, E. V. Hale, F. F. Sanford, J. R. Nutt, H. R. Newcomb, J. F. Whitelaw, J. R. Mills, E. C. Collins, H. Coulby, W. W. Waterson, W. W. Smith, F. B. Smith, Roy Williams, A. T. Harvey, Luther Allen, L. C. Hanna, D. R. Hanna, R. S. Ireland, D. Z. Norton, E. W. Oglebay, W. D. Rees, W. B. Castle, R. R. Rhodes, W. C. Rhodes, Jno. Mitchell, Alf. Mitchell, J. H. Bartow, M. A. Bradley, J. H. Sheadle, Wm. G. Mather, Ralph Gray, Guy Gray, Jno. Corrigan, Jas. Corrigan, F. M. Osborne, F. W. Hart, Caleb E. Gowen, W. A. Hawgood, H. A. Hawgood, A. N. Hawgood, H. S. Wilkinson, Burton C. Ayers, E. P. Lenihan, L. C. Smith, B. Lyman Smith, H. W. Smith, Wilbert L. Smith, Monroe C. Smith, A. W. Thomson, J. E. Upson, R. McLauchlan, E. Morton, H. H. Brown, Fayette Brown, D. B. Chambers, L. P. Smith, J. A. Smith, Wm. Gerlach, T. F. Newman, J. C. Gilchrist, John D. Gilchrist, A. J. Gilchrist, Frank R. Gilchrist, Joseph A. Gilchrist, J. S. Weeks, J. F. Wedow, E. M. Carleton, W. C. Richardson, C. L. Hutchinson, W. H. McGean, Frank Seither, C. O. Jenkins, N. S. Keller, H. Steinbrenner, Geo. M. Steinbrenner, E. D. Carter, W. G. Pollock, W. H. Becker, C. H. Sinclair, Jas. Davidson, Jas. E. Davidson, H. D. Goulder, H. D. Coffinberry, C. E. Grover, A. T. Kinney, C. H. Wellman, S. T. Wellman, T. R. Morgan, John W. Seaver, Alex. E. Brown, F. G. Tallman, F. C. Phillips, A. W. Horton, John Donaldson, Fred Saal, E. T. Bierce, R. H. Fetterman, C. L. Gibson, J. L. Smith, M. E. Gaul, J. D. Brown, A. C. Saunders, H. B. Nye, E. Williams, S. H. Holding, F. S. Mastin, Wm. W. White, Andrew Squire, W. B. Sanders, J. H. Dempsey, C. T. Brooks, J. H. Bartow, Jno. C. Chandler, Rollin C. White, Windsor T. White; F. W. Gehring, S. F. Haserot, F. H. Haserot, Lieut. Arthur Dovale, all of Cleveland; Al. Davis, Detroit; John Hemmeter, Detroit; Gus. Mobs, Detroit; John Woodhouse, Detroit; Irving Taylor, Detroit; A. H. Reeder, Dayton; Chris. Riddle, Delaware; Dave Battenfield, Delaware; Ed. Swisher, Columbus; Chas. Davis, Cincinnati; Max Davis, Cincinnati; Geo. W. Rolph, San Francisco; J. Friedman & Co., Chicago; John H. Meyer, Chicago; Fred Meyer, Chicago; L. P. Sutter, Chicago; Chas. Riegel, Chicago; Wm. Brown, Chicago; Lawrence and Wm. Crump, Chicago; Mat. Berriman, Chicago; Dr. R. L. Potter, Chicago; Leslie Pantin, Havana, Cuba; H. L. Kinney, Cleveland; H. R. Kinney, Lakewood, O.; J. A. Kinney, Philadelphia; E. L. Kappleman, John Bain, Jr., Max Mandelbaum, Frank Wolfe, P. E. Near, Allie Wight, Geo. W. Gillies, M. E. Flaherty, I. M. Lyman, Joe Duys, all of New York; E. H. Smith, Springfield, Mass.; Enos Smith, Springfield, Mass.; C. F. Schoverling, Springfield, Mass.; LeRoy Randell, Springfield, Mass.; N. A. Barron, Cleveland; D. D. Dickey, Cleveland; W. H. Boyd, Cleveland; Louis Peters, Detroit; Louis A. Peters, Detroit; Ernest Hathaway, New York; John J. Schlonge, St. Louis; John Hetterman, Louisville, Ky.; Aug. Kurz, Milwaukee; Bert Kinney, Centralia, Wash.; W. M. Baker, Seattle, Wash.; Geo. Lindmuller, Fred Borton, Scribner & Loehr, Dr. Vin-

CAPT. A. B. WOLVIN.

MR. J. C. WALLACE.

cent Kerr, Dr. Wendell H. Johnson, Fred Mathewson, Chas. Seman & Sons, all of Cleveland; Wm. Elwell, Lakewood, O.; A. J. Pearce, Coldwater, Mich.; Fred Stock, St. Paul; G. F. Kuhles, St. Paul; W. H. Kildon, Tiffin; Dr. Haden White, Spokane, Wash.; A. E. Nott, Minneapolis; C. B. Burger, Detroit; Admiral Chas. W. Rae, U. S. N., Washington, D. C.; Capt. James H. Perry, U. S. N., Washington, D. C.; F. T. Bowles, Quincy, Mass.; Henry J. Gielow, New York; Theo. E. Ferris, New York; DeCourcy May, Camden, N. J.; Frederick W. Wood, Philadelphia; E. J. Dodge, San Francisco, Cal.; J. A. Bensel, New York; Andrew M. Joys, John Joys, John C. Ruger, Mrs. W. E. Fitzgerald, Joseph Davidson, Thos. Sheriffs, Edward Uhrig, Jos. Kavanaugh, all of New York; Eli Gunnell, Manitowac, Wis.; Mr. West, Manitowac, Wis.; C. P. Wheeler, Jas. S. Keefe, Frank Baackus, John W. Gates, Jno. Laniburt, David B. Forgan, Robert Forsyth, Marshall Field, H. H. Porter, H. H. Porter, Jr., all of Chicago; C. W. Wetmore, Colgate Hoyt, W. T. C. Carpenter, F. T. Gates, R. C. Veit, D. E. Ford, all of New York; James McCrae, Pittsburgh, Pa.; Joseph Wood, Pittsburg, Pa.; W. A. Paine, Pittsburg; John Stanton, New York; Andrew Friedman, New York; John O'Rourke, New York; Eugene Grasselli, Cleveland; Herbert L. Satterly, New York; Dr. E. E. Beeman, Cleveland; E. S. Cramp and H. G. Mull, of Philadelphia; W. A. Post, Newport News, Va.; Charles R. Hanscom, New London, Conn.; H. A. Andrews, Bath, Me.; Martin Seddinger, Philadelphia; W. G. Randle, Camden, N. J.;R. L. Newman, New York; Capt. James Stone, Cleveland; James McGrath and George L. DeWolf, Cleveland; J. A. Sarstedt, J. B. Molyneaux, John B. Cowle, Fred Hindeman, Cleveland; S. Buchanan, Windsor, Ont.; Henry Beatty Toronto, Ont.; A. W. Piers, Montreal; Prof. Cecil H. Peabody, Boston; Prof. C. F. Durand, Ithica; Prof. H. C. Sadler, Ann Arbor; Hugh Calderwood, Collinwood, Ont.; H. W. King, R. E. Burdick, A. S. Johnson, Wilbur S. Bailey, E. S. Hessenmueller, Ezra Bowen, J. B. Coffinberry, Mrs. W. S. Mack, H. J. Davies, F. H. Tarbell, L. A. Ranney, W. H. Bowworth, Capt. L. M. Coe, Rev. J. W. Malcolm, C. L. F. Weiber, Theodore Kundtz, C. A. Grasselli, William Fitch, L. E. Holden, L. Dean Holden, L. A. McCreary, W. C. Furst, W. F. Herman, E. D. Shurmer, F. D. Underwood, N. P. McKean, M. J. Mandlebaum, F. H. Townsend, C. A. Post, J. H. Kuzell, V. S. Pack, H. Clark Ford, George Warmington, D. R. Warmington, C. L. Murfey, L. A. Murfey, Tom L. Johnson, Howard Shaw, L. A. Cobb, H. C. Ellison, William Chisholm, Wilson B. Chisholm, S. H. Chisholm, all of Cleveland; Lindsay H. Wallace, Harry Smith, Ithaca, N. Y.; Leander McBride, J. P. Lampson, J. G. Jennings, F. P. Case, L. Schlather, T. H. Worthington, J. F. Corlett, J. H. Wade, William Chisholm, J. H. McBride, L. Parmelle, M. T. Herrick, T. W. Hill, H. Tiedemann, Lyman H. Treadway, F. W. Treadway, C. A. Otis, Jr., A. H. Hough, W. P. Johnson, W. D. B. Alexander, J. W. Chandler, J. E. Collins, J. E. French, F. H. Gogg, D. Leuty, George W. Kinney, Nelson Moses, S. L. Severance, H. A. Sherwin, James Beardsley, S. P. Fenn, J. J. Sullivan, John J. Stanley, B. F. Bourne, S. H. Elliott, H. A. Fuller, A. H. Gilmore, M. H. Andrews, Silas Hitchcock, J. H. Ashley, H. M. Hanna, Jr., S. M. Folsom, F. C. Richards, T. E. Young, L. B. Muller, Howard Stebbins, C. C. Canfield, H. S. Pickands, Jay M. Pickands, Capt. George Mallory, H. A. Willare, George Lillis, J. C. Trask, M. H. Marks, Kaufman Hays, R. A. Harman, F. F. Hickox, all of Cleveland; W. E. Corey, James Gayley, E. H. Gary, W. B. Dixon, Daniel G. Ried, H. H. Rogers, Charles M. Schwab, John D. Rockefeller, Jr., all of New York; Horman B. Ream, Chicago; Judge William H. Moore, William Edenborn, William H. Hoxie, W. I. Babcock, Stevenson Taylor, C. W. Wetmore, Colgate Hoyt, W. T. C. Carpenter, F. T. Gates, R. C. Veit, D. E. Ford, all of New York; S. N. Parent, Quebec; John Fitzpatrick, Ottawa, Can.; W. H. Richardson, Conneaut; Arthur Caton, Chicago; George W. Peavy, F. B. Wells, F. T. Heffelfinger, St. Paul, Minn.; Frank Jeffreys, Robert Moore, A. C. Diericx, San Francisco; M. E. Farr, Detroit; Frank E. Kirby, Detroit; W. L. Mercereau, Ludington, Mich.; A. C. Pessano, George H. Russel, C. B. Calder, Detroit; H. C. Frick, George Oliver, George E. Tener, Frank H. Robbins, James Walsh, D. M. Clemson, D. G. Kerr, J. H. Reed, Thomas Morris and A. H. Peacock, of Pittsburgh.

WAGE SETTLEMENT WITH ENGINEERS.

At a conference between Mr. Harry Coulby, president and general manager of the Pittsburg Steamship Co., and Capt. A. B. Wolvin of the Provident Steamship Co. and other fleets, held in Cleveland on Wednesday, arrangements were made with the engineers for the season of 1904. The engineers will be employed by the month, instead of by the year as formerly, and will be given last year's schedule of wages. This arrangement is perfectly satisfactory to them. The wage schedule is as follows:

First-class, steel steamers—All steel freight steamers, 2,100 tons or over, all steel package freight steamers over 1,800 tons and all passenger steamers over 1,200 tons.

Second-class—All steel freight steamers 500 to 2,099 tons and not included in first-class, and all passenger steamers 300 to 1,199 tons.

Third-class—All steel steamers not included in first and second classes, and all passenger steamers under 300 tons.

WAGES—STEEL STEAMERS.

	Per month.
First-class—Chief	$150
First assistant	100
Second assistant	75
Second-class—Chief	125
Assistant	90
Third-class—Chief	105
Assistant	75

Wooden steamers—First-class to include all steamers over 1,200 tons and all package freight steamers over 750 tons; second-class, all steamers between 600 and 1,199 tons; third-class, all steamers between 200 and 599 tons; fourth-class, all steamers not included in above.

WAGES WOODEN STEAMERS.

	Per month.
First-class—Chief	$125
Assistant	90
Second-class—Chief	114
Assistant	84
Third-class—Chief	105
Assistant	75
Fourth-class—Chief	95
Assistant	65
Fish tugs—Large	105
Small	90

The Great Lakes Engineering Works, Detroit, Mich., has received an order from the Michigan Central railroad to increase the engine power of the ferry transfer. The two engines operating the paddle wheels will be converted into double tandem compounds and the stern propeller engine will be made into a cross compound.

The tug Evans, owned by the Great Lakes Towing Co., stranded on Racine reef last week while towing the schooner Athens from Milwaukee to Chicago. The crew of the Evans was taken off by the life-savers at Racine.

CANADIAN SHIPPING NOTES.

J. Hodgson has resigned as member of the Montreal harbor commission.

J. B. Kennedy has been appointed a commissioner of the pilotage district of New Westminster, B. C.

Capt. L. Bernard, for 45 years engaged in navigation on the great lakes, died at Sault Ste. Marie, Ont., recently.

A steamer named the Granville has been launched at Shelburne, N. S., for the Valley Steamship Co. The engines are to be installed at Yarmouth.

The tug Charles Jones has been launched from Abbey's yard at Owen Sound. An interesting feature of the launch was the launching through the ice, a basin having to be cut out through ice over a foot thick.

C. A. Jaques of Montreal, manager of the Montreal-Toledo line of steamers, states that the company is considering plans for two new steamers for the route. The Melbourne and Cuba will be on the run as usual about May 1.

The Dominion government has purchased the German antarctic exploration steamer Gauss, to be used as a survey and patrol vessel in Hudson's bay and other points on the Arctic ocean. Capt. Bernier will have command of the steamer.

Capt. R. Mosher, a pioneer navigator on the Rainy river and the Lake of the Woods, Ont., died at Fort Frances, Ont., recently. His sons have recently moved to Prince Albert, Sask., to engage in navigation on the Saskatchewan river.

The steamer Greetlands has been sold by J. T. Ross of Quebec to a Norwegian firm, who will put her in the general trade. For some years the Greetlands traded from Montreal to Prince Edward Island under charter to Hy. Dobell & Co.

The Quebec Steamship Co. reports having had a very satisfactory year. The directors for the current year are: Hon. P. Garneau, D. C. Thomson, J. C. Thomson, A. F. Hunt, W. Simons, G. T. Davie, W. Price of Quebec; F. H. Botterell, and M. N. Delisle of Montreal.

C. T. White of Apple River, N. B., who purchased the steamer Westport I, has had her thoroughly overhauled and the accommodation improved. It is proposed to change her name to the Mikado, and to employ her in the coasting trade for freight and passengers. Capt. E. H. Lewis will be in command.

The steamer Mermaid of Nanaimo, while on one of her regular trips from Vancouver to Jarvis Inlet, B. C., recently ran on a rock and sank. The passengers and crew were all saved. Two years ago the Mermaid ran on a rock outside Victoria harbor and sank, but was raised and refitted. The Mermaid was valued at $22,000.

G. D. Ellis has been appointed manager of the Turbine Steamship Co., and following have been appointed officers of the steamer which was launched at Hebburn-on-Tyne, Eng., last week, and is expected at Hamilton, Ont., to take up the run to Toronto May 24: Capt. Crawford, master; Capt. Maddocks, chief officer; C. Arthur, purser.

The Anticosti, a sister lightship to the Lurcher, was launched from the yard of the Polson Iron Works, Toronto, April 9, for the Dominion government. The vessel, which was launched during a heavy fog, was christened by Miss Polson. Col. Anderson, deputy minister of marine, represented the government, and Mr. F. W. Redway, naval architect, and W. Jeffrey represented the builders. The steamer will be completed and it is expected that she will be placed on her station off Anticosti island, Gulf of St. Lawrence, in June. The keel plates for the new fisheries protection cruiser for the great lakes are all ready to be laid on the blocks from which the Anticosti was launched.

The Montreal, Ottawa & Georgian Bay Canal Co., which proposes to render navigable for vessels of 20 ft. draught the Ottawa river from Montreal to Mattawa; from that point to canalize the Mattawa river, to cut a canal from the headwaters of that river over the height of land to Lake Nipissing, and thence via the French river to Georgian bay, has applied to the Dominion parliament for an extension of time for the construction of the works. The company, which is backed by British capital, has made a survey of the route, and the estimated cost of the work is $70,000,000. An application was made some time ago to the government for a guarantee of interest on that amount during construction of the work, but nothing was done. The project so far as the French river and Lake Nipissing portion is concerned, was given strong support by Hon. J. I. Tarte, formerly minister of public works.

The following additional appointments have been made for the season:

Montreal & Lake Superior Transportation Co.'s line: J. H. Plummer—Capt. MacKay, master; R. Chalmers, engineer. H. M. Pellatt—Capt. G. Bryan, master; J. Byers, engineer. A. E. Ames—Capt. R. Chestnut, master; S. Gillespie, engineer.

Algoma Transit Co.: King Edward—Capt. W. Bemrose, master; S. Beattie, engineer. Minnie M.—Capt. A. Batten, master; J. Grimes, engineer. Polaki—Capt. Garvey, master; Jas. Greig, engineer. Leafield—Capt. K. Jordan, master; A. Foote, engineer. Theano—Capt. E. Pearsall, master; J. L. Smith, engineer.

Other appointments are:

Wexford—Capt. W. J. Bassett, master; D. McLeod, engineer.

Strathcona—Capt. Alex. Irving, master; F. Smeaton, engineer.

W. D. Matthews—Capt. J. Ewart, master; E. J. Odell, engineer.

Newmount—Caut. F. A. Bassett, master; J. W. Aston, engineer.

Donnacona—Capt. Maudsley, master; C. Dugold, engineer.

Westmount—Capt. Milligan, master; H. Young, engineer.

Turret Crown—Capt. J. Dicks, master; W. Robinson, engineer.

NEUTRAL FLEETS IN THE FAR EAST.

The most powerful of the neutral fleets now in the far east is the British. It consists of fifteen large vessels, divided as follows: Four battleships of 12,950 tons each, and one of 10,500 tons; three armored cruisers, two of which are of 14,100 tons, and one of 12,000 tons; two first-class cruisers of 11,000 and 9,000 tons respectively; four second-class cruisers, two of which are of 3,600 tons each, and the others 3,600 and 3,400 tons; the powerful list closes with one third-class cruiser of 1,580 tons, besides sloops, gunboats and destroyers.

Next to the British fleet that of the United States is the most powerful, consisting of three battleships, one coast defense ship, six cruisers, several gunboats and a flotilla of destroyers. The grand old Oregon, 10,228 tons, is there ready for business, together with the fine new Kentucky and Wisconsin, of 11,500 tons each. The monitor Monterey, 4,084 tons, is also there. Our cruisers, the San Francisco, New Orleans, Albany, Cincinnati and Raleigh, are also ready to give a good account of themselves, if need demands. Admiral "Fighting Bob" Evans is the right man in the right place at this momentous juncture.

The French squadron comprises two armored cruisers, one first-class cruiser, three smaller cruisers, besides gunboats and torpedo craft. In addition, two armored cruisers of 10,014 tons each, are on the way to reinforce the squadron.

Germany ranks next among the neutral fleets, being represented by eight cruisers, but only one is of the armored class. Four battleship of the Kaiser class are also about leaving the Baltic for the German Far East station of Kiao-Chan. The largest of the German vessels is the Furst Bismarck, of 10,700 tons.

Italy closes the list with three cruisers (one armored), now on the ground, and four under orders to go there.

WALTER J. BALLARD.

Schenectady, April 6.

WANTED and FOR SALE Department.

FOR SALE.

Steam Yacht for Sale.

Steam Yacht "Huntress," built in 1880, now in first class repair; $1,000 repairs to hull last fall. Carries 210 passengers. Will make 11 miles an hour all day; economical to run. Cost $18,000. Cash price asked, $6,000. Write for particulars C. S. Cadwallader, Secretary Smith, Davis & Co., Buffalo, N. Y.

Apr. 14

Schooner for Sale.

For Sale —Schooner Minnie Slauson. 317 gross tons. Rated A 2. For information inquire of Capt. L. Larson, 812 Huron St., Manitowoc, Wis. tf

Tug for Sale.

Tug Duncan City. Address, Geo. Pankrantz, Lumber Co., Sturgeon Bay, Wis. tf

Propeller for Sale.

A four blade built up manganese bronze Propeller, right handed, 9 ft. 2 in. diameter, pitch 10 ft., adjustable 6 in. either way, for sale; also two breech loading brass cannon, 42 in. long, 2½-in bore, with reducers for using 1¾-in. shells; also guns and plan of wheel at Marine Manufacturing Supply Co., 158 South st., New York. Apr 21

Tug for Sale.

Tug Frank Canfield, 75 ft. long. Engine 18 x 20, boiler 6½ x 13. Address Canfield Tug Line, Manistee, Mich. Apr. 28

FOR SALE.

Steamer for Sale at Cost, $13,500.

The old Anchor Line twin-screw steamer Gordon Campbell. Two decks, gangways, hoisting machinery, etc. Suited to carrying coal, lumber, ties, package freight, etc. Spent $3,500 in repairs this year. Other business requires my undivided attention and I will sell for cost to me. W. F. Carroll, 1011 Ashland block, Chicago. tf

Sand and Gravel Outfit.

For Sale Cheap.—Complete sand and gravel outfit. Most economical plant in North America. For particulars address Osborn & Co., Duluth, Minn. Apr. 14

Yacht for Sale.

New beautiful 100-ft. steam yacht, fully equipped. Owner physically unable to use yacht. Will sell for any reasonable offer. Yacht can be seen in Detroit. Address M. J. Steffens, 57 East Twenty-second st., Chicago. tf

Chicago, Saugatuck & Douglas Trans. Co.

This boat line (two steamers, docks, etc.) for sale. For particulars apply to Griffin & Henry, Saugatuck, Mich. May 5

Diving Outfit For Sale.

Three iron bound cases containing a complete diving outfit for $175 cash. The suit and equipment is in first-class working order with 70 ft. new air hose. Bert E. Linehan, Dubuque, Ia. May 5

FOR SALE.

Barge for Charter.

Barge William Case, of 266 gross tons, to let for the season. A money maker for some owner or captain of a steamer who could use her as a consort. For further particulars address, Box 62, care Marine Review, Cleveland, O. Apr. 21

WANTED.

Passenger Steamer.

Passenger steamer to carry 700 or more passengers from Milwaukee to Whitefish Bay Resort, Wisconsin. Exclusive landing rights given for pier. Address H. Konopka, Whitefish Bay, Wis. Apr. 14

Treasury Department, Office of General Superintendent U.S. Life-Saving Service, Washington, D.C., April 11, 1904. Sealed proposals will be received at this office until 2 o'clock p. m. of Thursday, the 5th day of May, 1904, and then publicly opened, for furnishing supplies required for use of the Life-Saving Service for the fiscal year ending June 30 1905; the supplies to be delivered at such points in New York City, Grand Haven, Mich., and San Francisco, Cal., as may be required, and in the quantities named in the specifications. The supplies needed consist of Beds and Bedding; Blocks and Sheaves; Cordage; Crockery; Furniture; Hardware; Lamps, Lanterns, etc.; Medicines, etc; Paints, Oils etc; Ship Chandlery; Stoves etc.; Tools, and Miscellaneous Articles; all of which are enumerated in the specifications attached to the form of bid, etc., which may be obtained upon application to this office, or to the Inspector of Life-Saving Stations, 17 State Street, New York City; Superintendent Twelfth Life-Saving District, Grand Haven, Mich.; and Superintendent Thirteenth Life-Saving District, New Appraisers' Stores, San Francisco, Cal. Envelopes containing proposals should be addressed to the "General Superintendent U.S. Life Saving Service, Washington, D C.." and marked on the outside "Proposal for Annual Supplies." The right is reserved to reject any or all bids, and to waive defects if deemed for the interests of the Government. S. I. KIMBALL, General Superintendent. Apr. 21

FARES TO ST. LOUIS.

World's Fair Excursions via Pennsylvania Lines.

The sale of excursion tickets over Pennsylvania Lines to St. Louis, account of the World's Fair, will begin on Monday morning, April 25, five days in advance of the date of the formal opening of the Louisiana Purchase Exposition.

The excursion fares from Cleveland are fixed as follows:

Tickets good for the season, returning any time to Dec. 15, will be sold every day at $24.00 for the round trip.

Tickets good returning within sixty days, not later than Dec. 15, will be sold every day at $19.00 for the round trip.

Tickets good returning within fifteen days will be sold every day at $16.00 for the round trip.

Coach excursion tickets, with return limit of seven days, will be sold twice a week, every Tuesday and Thursday, beginning May 17, until June 30, at $12.00 for the round trip, approximately one cent a mile. Coach excursion tickets are restricted to day coaches, whether on regular or special trains.

For further particulars write or call on Geo. W. Weedon, D. P. A., No. 1 Euclid ave., Cleveland. Apr. 25

Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

AMERICAN PRACTICAL NAVIGATOR—Nathaniel Bowditch. 1903 edition $2 25

DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8¾ in. by 5 in., cloth 1 50

ELECTROMAGNETIC PHENOMENA AND THE DEVIATIONS OF THE COMPASS—Com. T. A. Lyons 6 00

ELEMENTARY SEAMANSHIP—By Barker. New and enlarged edition 2 50

ELEMENTS OF NAVIGATION—Henderson 1 00

HAND BOOK OF ADMIRALTY LAW—Robt. M. Hughes.... 3 75

HINTS ON LEGAL DUTIES OF SHIPMASTERS—B. W. Ginsburg 1 75

HOW TO BUILD A LAUNCH FROM PLANS—, with general instructions for the care and running of gas engines. Chas. G. Davis 1 50

ILLUSTRATED NAUTICAL ENCYCLOPEDIA—Howard Patterson 3 00

INTERNATIONAL SIGNAL CODE—Bureau of Navigation. New edition 3 00

KNOW YOUR OWN SHIP—Thos. Walton 2 50

MANUAL OF ALGEBRA—R. C. Buck. For the use, more especially, of young sailors and officers in the merchant navy; numerous examples and exercises 1 50

MARINE INSURANCE—W. Gow 1 50

MARINER'S COMPASS IN AN IRON SHIP: How to keep it efficient and use it intelligently—J. W. Dixon..... 1 00

MODEL ENGINES AND SMALL BOATS—N. M. Hopkins. New methods of engine and boiler making; ship design and construction; fifty illustrations 1 25

MODERN SEAMANSHIP—Lieut. Com. Austin M. Knight, U. S. N. Adopted as the text book of the United States Naval Academy 6 00

MODERN NAVIGATION: A text book of navigation and nautical astronomy suitable for the examinations of the royal navy and board of education—Wm. A. Hall..... 4 00

MODERN PRACTICE OF SHIP BUILDING IN IRON AND STEEL—Samuel J. P. Thearle. Two volumes. Second edition, revised and enlarged 5 25

NAVAL ARCHITECTURE—Cecil H. Peabody. Just published... 7 50

NAVAL ARCHITECTURE: A treatise on laying off and building wood, iron and composite ships.—Samuel J. P. Thearle. In two volumes 3 00

NAVAL ARCHITECTURE: A manual on laying off iron and steel vessels—Thos. H. Watson. Valuable for naval architects as well as beginners in ship yards..... 5 00

NAVAL ARCHITECTURE—Sir W. H. White. New edition. 750 pages 9 00

NAVAL ARCHITECTS AND SHIPBUILDERS' POCKET BOOK—Clement Mackrow. Formulae, rules and tables, and marine engineers' and surveyors' Handy Book of Reference. Eighth edition, revised and enlarged 5 00

NAVIGATION SIMPLIFIED—C. E. McArthur. Containing all problems required for U. S. Local Inspector's Examination of Masters and Mates of seagoing vessels $1 00

POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery 3 00

PRACTICAL COMPASS ADJUSTMENT on Iron, Composite and Wooden Vessels. Illustrated.—Capt. W. J. Smith 2 00

PRACTICAL INFORMATION ON THE DEVIATION OF THE COMPASS, for the use of Masters and Mates of Iron Ships—J. T. Towson 2 00

PRACTICAL SEAMANSHIP FOR USE IN THE MERCHANT SERVICE: Including all ordinary subjects; also Steam Seamanship. Wreck Lifting, Avoiding Collision, Wire Splicing, Displacement and everything necessary to be known by seamen of the present day. Second edition, illustrated.—John Todd and W. B. Whall 8 40

RESISTANCE AND PROPULSION OF SHIPS—Durand..... 5 00

SELF-INSTRUCTOR IN NAVIGATION AND PRACTICAL GUIDE to the examinations of the U. S. Government Inspectors for masters and mates of ocean-going steamships and sailing vessels—Capt. W. J. Smith. Second edition, revised and enlarged. Cloth bound 2 00

SELF-INSTRUCTION IN THE PRACTICE AND THEORY OF NAVIGATION—Earl of Dunraven. Two volumes..... 7 00

SHIP BUILDING—Tables for constructing ship's lines. Second edition. Archibald Hogg 2 00

SIMPLE ELEMENTS OF NAVIGATION—Young. New second edition 2 00

SMALL YACHT CONSTRUCTION AND RIGGING—Linton Hope 3 00

STABILITY OF SHIPS—Sir E. J. Reed 8 40

STEEL SHIPS: Their Construction and Maintenance. A manual for ship builders, ship superintendents, students and marine engineers—Thos. Walton 5 50

TEXT BOOK OF NAVAL ARCHITECTURE—J. J. Welch 1 50

TEXT BOOK OF SEAMANSHIP—Com. S. B. Luce. U. S. N. Equipping and handling of vessels under sail *or* steam.... 10 00

THEORETICAL NAVAL ARCHITECTURE: A treatise on the calculation involved in naval design—Samuel J. P. Thearle. In two volumes 3 50

THEORETICAL NAVAL ARCHITECTURE—E. L. Attwood. Text book; 114 diagrams 2 50

"WRINKLES" IN PRACTICAL NAVIGATION. Ninth edition, revised. S. T. S. Lecky 8 40

YACHT ETIQUETTE—Capt. Howard Patterson 1 00

Sent to any address, carriage prepaid, at prices named. There is no book on Navigation, Marine Engineering, Ship Building, or the allied industries, that is not either published or for sale by the

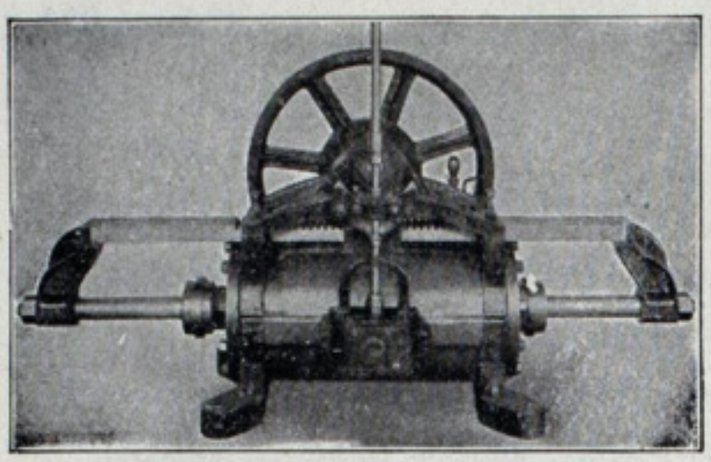
MARINE REVIEW,

39-41 Wade Bldg., CLEVELAND, O.

A STEAM STEERER

DIRECT AND POSITIVE

QUICK ACTING. SPECIALLY ADAPTED



for Steam Yachts, Ferryboats, Lake, Ocean and Harbor Tug Boats.

Send for Catalogue and Particulars

MOULTON STEERING ENGINE CO.

17 State St., NEW YORK CITY.

CRANE VALVES

ESTABLISHED 1855

SMOOTH-ON

TRADE MARK

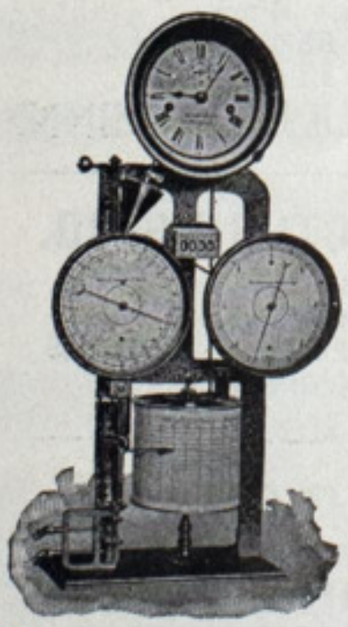
Iron Cement No. 1

Unequaled for boiler patching, making flanged joints, stopping leaks in boiler seams, it has saved the use of many boilers, and for foundry use. SMOOTH-ON when mixed with water becomes a hard metallic iron that expands and contracts with the iron, and will withstand fire, steam, water or oil. sold in 5, 10 and 25 pound blue labeled cans. 60 page catalogue, and name of nearest jobber on request.

SMOOTH-ON MANUFACTURING COMPANY

572-574 Communipaw Ave., JERSEY CITY, N. J., U. S. A.

Chicago Office, 61 N. Jefferson Street.



The

Nicholson Perfected Ship Log

is the only log that accurately shows the speed of the moment of a ship, on a dial, and records this speed on a paper chart for every minute of the trip. It also registers the distance travelled. No line overboard. Placed in chart house or wherever desired.

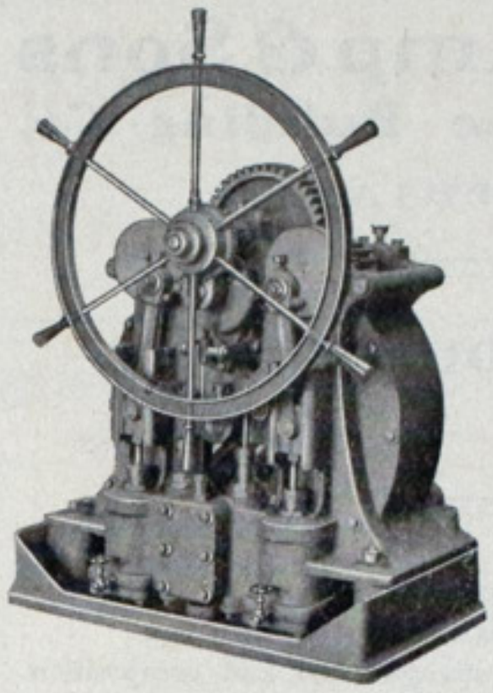
THE

Nicholson Marine Distance Finder.

ADVANTAGES CLAIMED:

The exact distance from any fixed point can readily be determined without any mathematical calculation. Anyone can easily learn to use it.

Nicholson Ship Log Co. 204 Superior St., CLEVELAND, O.



BECK

STEAM AND HAND STEERING GEAR.

Changed from steam to hand gear instantly. Rudder moved hard over through one or more turns of wheel as desired. Is self-locking. Will cushion any blow on rudder and return to position automatically. All gears are machine cut. Position of Rudder shown by Indicator at all times.

Pawling & Harnischfeger,

Clinton and So. Water Sts., MILWAUKEE, WIS.

COMPASS ADJUSTER

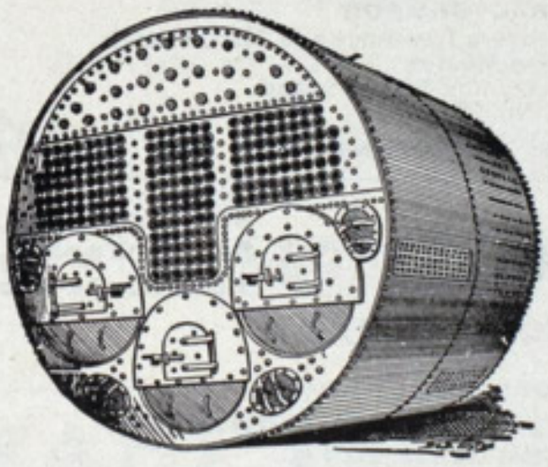
CAPT. J. M. FIELDS

INVENTOR OF AND AGENT FOR

Fields' Patent Course Finder.

40 Wade Bldg. - - CLEVELAND, O.

Northwestern Steam Boiler & Mfg. Co.



DULUTH, MINN.

MANUFACTURERS OF

Boilers, Engines and Machinery.

Special facilities for Marine Work. Repairs promptly attended to Night or Day.

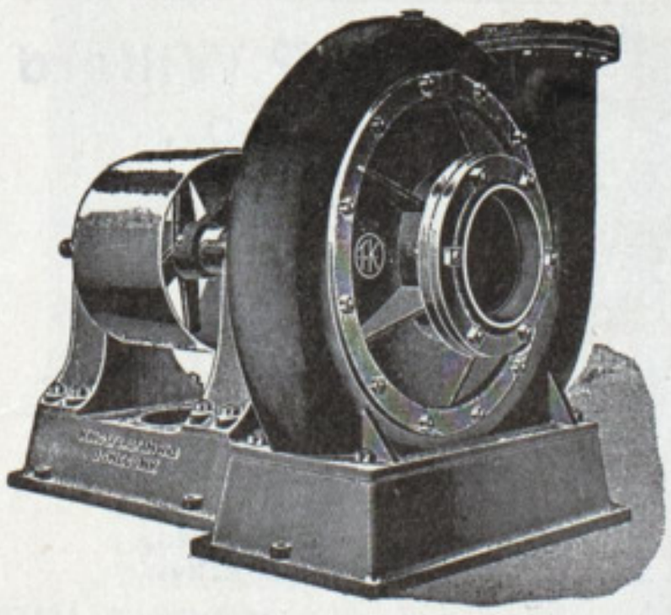
We carry a complete line of Marine and Engineers' Supplies.

TELEPHONES:

OFFICE AND WORKS, **615.**

Residence Calls:

M. A. RYAN, Pres. and Gen'l Mgr., **776 R.**
J. H OPPERMAN, Secretary, **579 R.**
E. KRIZ, Superintendent, **557 M.**



DREDGING, WRECKING

CIRCULATING

AND BALLAST PUMPS.

MARINE BOILERS.

Kingsford Foundry & Machine Works,

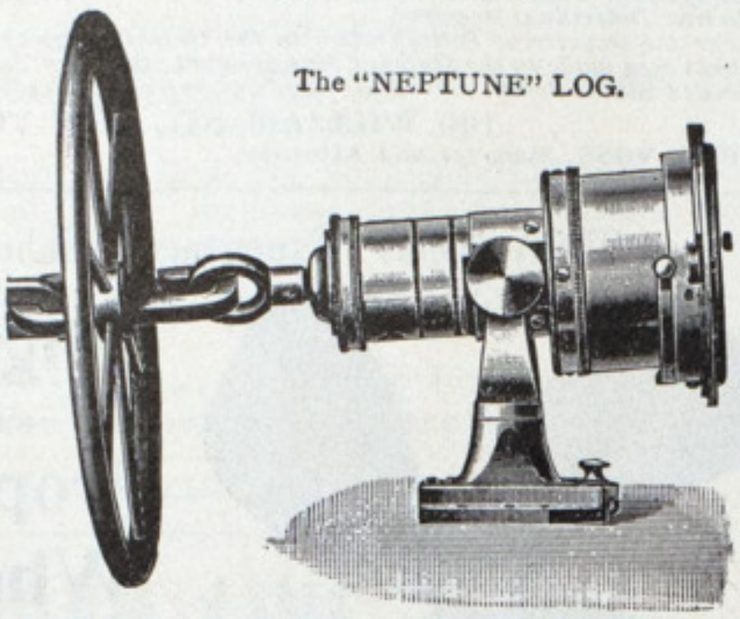
OSWEGO, N. Y.

THOMAS WALKER & SON,

BIRMINGHAM, ENGLAND.

THE "NEPTUNE" SHIP-LOG With Ball Bearings for HIGH SPEEDS.

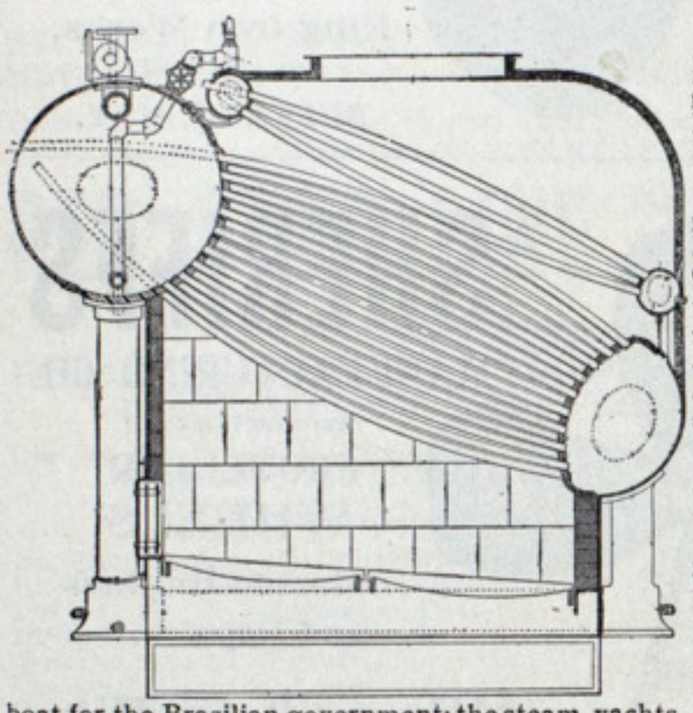
Also makers of the "CHERUB" and "HARPOON" SHIP-LOGS.



The "NEPTUNE" LOG.

MAKERS TO THE BRITISH NAVY.

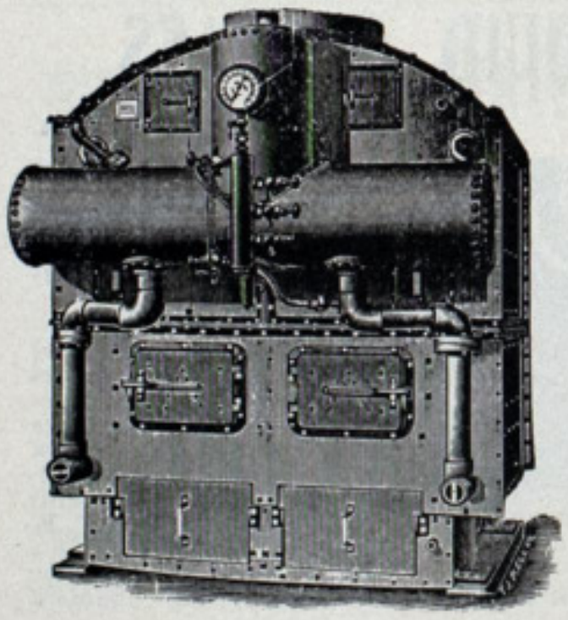
THE MOSHER PATENT WATERTUBE BOILER.



Simplest, lightest and most compact boiler made. Most accessible for cleaning and repair. Five vertical rows or as many as 45 tubes may be cleaned or withdrawn by removing the cover from a single hand hole. Largest grate surface on a given floor space. No joints in the fire All joints expanded. Greater steam room and water capacity than any other boiler. Built in sizes up to 2000 H. P. Mosher Boilers have been supplied for eleven torpedo boats and the monitor Florida of the U.S. Navy, amounting to over 26,000 H.P.; six torpedo boats for the Russian Navy, two gunboats for the Mexican government, one cruiser and one torpedo boat for the Brazilian government; the steam yachts Arrow, Ellide, Feiseen, Wauneta, Presto, and numerous other yachts and vessels.

SEND FOR DESCRIPTIVE CATALOGUE.

MOSHER WATERTUBE BOILER CO., No. 1 BROADWAY, N. Y.



250 STEAM VESSELS

Now Equipped With

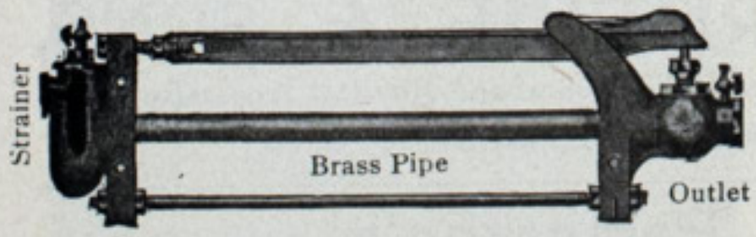
ALMY'S PATENT SECTIONAL Water Tube Boilers

Bear Evidence of Their

Excellent Qualities

Almy Water-Tube Boiler Co.

PROVIDENCE, R. I.



Kieley Expansion Steam Trap

Best Trap made ..for.. **Marine Work.**

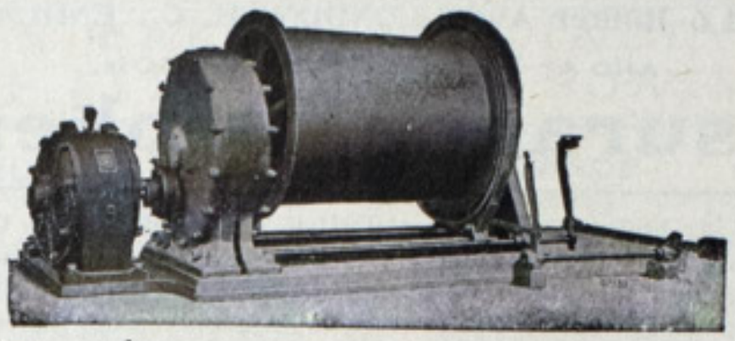
Good for any pressure. Valve opens full area.

Also Reducing Valves, Steam Separators and Open Float Traps for Marine Purposes.

Write for Catalogue. SENT ON TRAIL.

KIELEY & MUELLER, 7-17 West Thirteen Street, NEW YORK CITY.

Westinghouse Motors



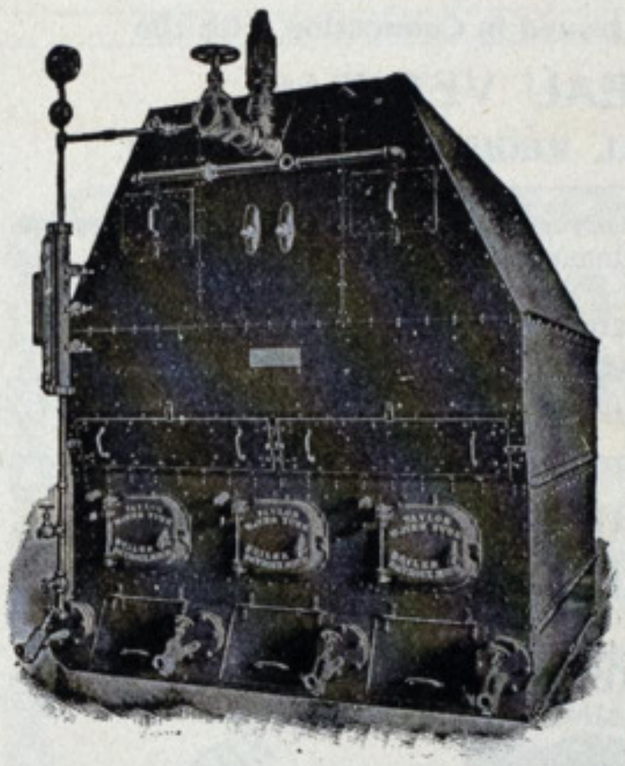
For Particulars { Alternating Current, Circulars 1050, 1062, 1066. Direct Current, Circulars 1042, 1068, 1077.

Westinghouse Electric & Mfg. Co

Sales Offices in all Large Cities Pittsburgh, Pa.

For Canada: Canadian Westinghouse Co., Limited, Hamilton, Ontario.

Taylor Water Tube Boiler Co.



322 Franklin St., DETROIT, MICH.

Vertical Tubes, sectional, large steam space and liberating area.

Fire box, combustion chamber, and course for the furnace gases similar to the Scotch Marine.

Free circulation type.

Send for full description.

The MARTIN-BARRISS CO.

IMPORTERS AND MANUFACTURERS OF

MAHOGANY, WHITE MAHOGANY

AND ALL NATIVE CABINET WOODS

High Grades of Kiln Dried Woods for Cabin Work and Inside Trim.

White Oak Timbers and Plank

Constantly on Hand and Sawed to Order on Short Notice,

654 SENECA ST. & CLEVELAND, O.

H. MOOERS COMPANY,

Dealers In

Pipe, Valves, Fittings, and Marine Engineers' Supplies.

Machine and Steam Fitting Shop.

Second and Sycamore Streets. **MILWAUKEE, WIS.**

Questions and Answers for Marine Engineers.

By Theo. Lucas.

Sent postpaid to any address for $2.00.

Marine Review, 39-41 Wade Bldg. Cleveland, O.

Chas. E. & W. F. Peck

ESTABLISHED 1870

58 William Street, New York City.
Royal Insurance Building, Chicago, Ill.

C. T. BOWRING & CO., Ltd.
5 and 6 Billiter Ave., LONDON, E. C., ENGLAND,
AND AT "LLOYDS," LONDON.

Insurance Brokers

As brokers we represent ONLY THE ASSURED. Our clients being the VESSEL OWNERS, we refuse to represent insurance companies. We place insurances in the most advantageous market at the best procurable rates and terms. We leave it to the managers and general agents of insurance companies to protect the interests of their companies, maintaining that it is impossible for us to devote ourselves to the interest of both the owners and the insurance companies at the same time.

Average Adjusting Department

Williamson Building. Cleveland, Ohio.

GREAT LAKES REGISTER.

INCORPORATED,

Combined and Issued in Connection with the

BUREAU VERITAS

INTERNATIONAL REGISTER OF SHIPPING.

Great Lakes Register desires to announce that its ratings go before the leading Underwriters of America, England and France.

THE SERVICES OF ITS SURVEYORS MAY BE ENGAGED ON HULL AND CARGOES

F. D. HERRIMAN, SURVEYOR GENERAL,
320-322 Perry-Payne Building, - - CLEVELAND. O.

The Only Standard American Classification of Shipping.

Has Authorized Agents in all the principal ports of the world to protect the interests of its patrons. Vessels built under its rules, or holding certificates of class in this Record of Shipping will, with their Cargoes, insure at lowest rates. Office, 66 Beaver Street, New York.

A. A. RAVEN, President. **W. R. T. JONES, Vice President,**
W. H. H. MOORE, Treasurer. **W. IRVING COMES, Secretary.**

The Donnelly Salvage and Wrecking Co., Ltd.,

JOHN DONNELLY, SR., Pres.
JOHN DONNELLY, JR., Vice-Pres.
H. B. FOLGER, Treas.
THOS. DONNELLY. Secy.

KINGSTON ONT.

DIVERS, STEAM PUMPS, TUGS, Etc.

SUPPLIED ON SHORTEST NOTICE.

ESTABLISHED 1865.

THE FRANKFORT Marine, Accident and Plate Glass INSURANCE CO.

of FRANKFORT-ON-THE-MAIN, GERMANY.

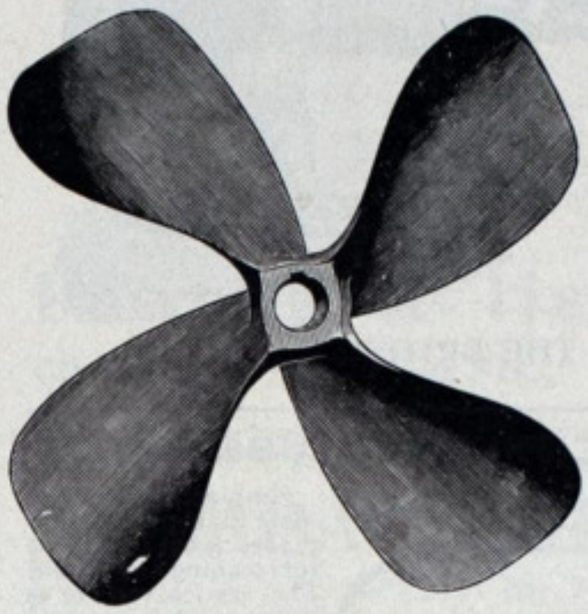
Employers Teams and Public Liability, Elevator Insurance, Workmen's Collective, Individual Accident.

For the security of Policyholders in the United States of America, a deposit has been made in the States of Massachusetts and New York of $400,000.00 in United States Bonds. *UNITED STATES DEPARTMENT,*

100 WILLIAM ST., NEW YORK, N. Y.

F. G. VOSS, Manager and Attorney.

Thirty Years' Experience building



Engines and Propeller Wheels.

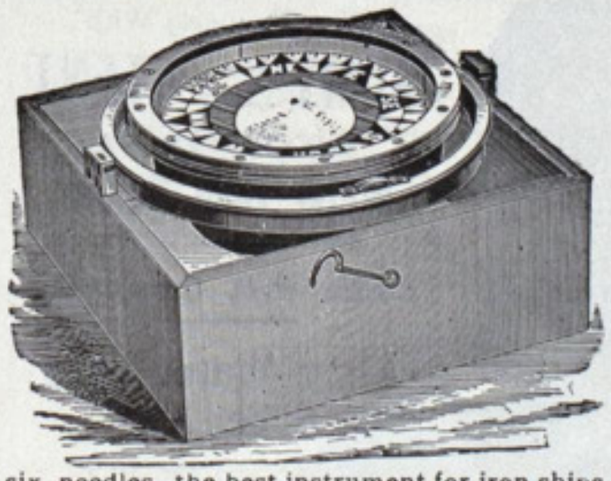
H. G. TROUT,
King Iron Works,
226 Ohio St.,
BUFFALO, N. Y.

SHERIFFS MANUFACTURING CO.

Manufacturers of
PROPELLER WHEELS
Marine Engines and Repairs.

Milwaukee, Wis.
Phone S. 163

RITCHIE LIQUID COMPASS



six needles, the best instrument for iron ships.

The Standard Liquid Compass.
Used Exclusively by the United States Navy For Over 35 Years.
Over 25,000 Used in Merchant Service.

Made in all sizes and styles, from 2 to 12 inches diameter of card. All compasses made by us have our name printed below the North point, or prominently upon the card. **NONE OTHER ARE GENUINE.** Latest form with four or and nautical instrument dealers. For sale by ship chandlers

CATALOGUE FREE.

E. S. RITCHIE & SONS,

Manufacturers of Nautical and Physical Apparatus,
BROOKLINE, MASS., U. S. A.

Patterson's Nautical Encyclopedia.

PRICE, $3.00

Is in all respects a work up to date, correct as to every term known to the shipping world. Sent upon approval. Carriage prepaid.

THE MARINE REVIEW **CLEVELAND.**

VESSEL AND INSURANCE AGENTS.

T. R. McCARTHY,
Steamship and Freight Broker.
Chartering, Forwarding and General Commission Agent; and Broker for the Sale, Purchase and Construction of Steamers and Sailing Vessels.
Marine and Fire Insurance Effected.
Cable Address, "MacCarthy, Montreal."
(Watkins', Scott's Liebers and A. B. C. Codes Used.)
Shipping Agents to The Asbestos & Asbestic Co., Ltd., of Danville, Que., and The Belgo Pulp & Paper Co., Shawinigan Falls, Que.
6 St. Sacrament St. MONTREAL, CAN.
Correspondence Invited and Agents Solicited.

Insurance.
PRINDIVILLE & COMPANY,
Average Adjusters.
Insurance Brokers.
12 Sherman Street,
CHICAGO.
Representing:
Johnson & Higgins, New York.
Represented by:
Willis Faber & Co., Ltd., London.
Jno. D. Tyson & Co., Liverpool.

P. H. FLEMING & CO.
Insurance and Vessel Agents.
Marine, Fire, Ocean, Liability.
Telephone, Harrison 1359.
No. 2 Sherman St., CHICAGO, ILL.

C. W. Elphicke. H. B Earhart.
C. W. ELPHICKE & CO.
Vessel and Insurance Agents.
No. 6 Sherman St., CHICAGO, ILL.
Telephone, Harrison 1194.

D. Sullivan. F. J Sullivan.
D. SULLIVAN & CO.
Vessel Agents.
Marine Insurance.
2-4 Sherman St., CHICAGO, ILL.
Office Tel., Harrison 2847. Res. Ashland 2488.

W. A. Hawgood. Arthur H. Hawgood.
W. A. HAWGOOD & CO.
Vessel and Insurance Agents.
220-21 Perry-Payne Bldg., Cleveland, O.
Telephones: Office, Main 2395. Res. W. A. Hawgood, Doan 84-J. Res. A. H. Hawgood. Doan 841-J.

J. Mitchell. J. F. Wedow. A. Mitchell.
MITCHELL & CO.
Vessel and Insurance Agents
508-10 Perry-Payne Bldg. Cleveland, O.
Office Tel. M. 767. Res. John Mitchell. Doan 341.
John F. Wedow, Doan 141-J.
Alfred Mitchell. Doan 218

C. L. Hutchinson. W. H. McGean.
HUTCHINSON & CO.
Vessel and Insurance Agents.
Phones: Office. Main 2453. Res. C. L. Hutchinson, Ridge 345 L. Res. W. H. McGean, East 1421-J.
313-15 Perry-Payne Bldg., Cleveland, O.

VESSEL AND INSURANCE AGENTS.

W. C. RICHARDSON,
Vessel Owner and Broker and Marine Insurance Agent.
420-421 Perry Payne Building,
CLEVELAND, O.
Office Tel., 338. Residence Tel., 2938.

C. P. GILCHRIST & CO.
Vessel and Insurance Agents.
Sale and Exchange of Vessels a Specialty.
Lumber and Coal Chartering.
Full Telephone Service, Office and Residence.
(Local and Long Distance.)
411 Perry-Payne Bldg., Cleveland, O.

John B. Hall. Harry B. Root.
HALL & ROOT,
Vessel Agents.
21-22 Exchange Bldg., 202 Main St.,
Telephone, Seneca 892. BUFFALO, N. Y.

JOHN J. BOLAND,
Vessel and Insurance Agent.
25-26 Exchange Bldg., 202 Main St.,
Telephone, Seneca 115 BUFFALO, N. Y.

J. J. H. Brown. J. B. Rodgers. Edward Smith.
BROWN & CO.
Vessel and Insurance Agents.
Dun Building, BUFFALO, N. Y.

D. T. HELM & CO.
Vessel and Insurance Agents.
Telephones—Office 263. Res. 381-3.
DULUTH, - - - MINN.

SAMUEL HOLMES,
Steamship Offices,
For Selling, Chartering and Building all Classes Steam Vessels
Steam Vessel Circulars
Weekly Freight Circulars
Morris Bldg, 66-8 Broad St., New York.

F. H. WEEKS,
Marine Broker.
Vessels Sold, Chartered Built and Insured.
Cable Address, WEEKSHIP, New York.
Telephone, 3275 Broad.
32 Broadway, NEW YORK.

Charles P. Notman. David H. E. Jones.
JAMES W. ELWELL & CO.
Established 1830.
Ship Brokers and Steamship Agents.
Sell and Charter All Classes of Vessels
Agents for Cyprien Fabre & Cie. S.S. Line. Cie. Havraise Peninsulaire and Northwestern S. S. Co. 21-24 State Street, NEW YORK

MARINE INSURANCE,
by
WILLIAM GOW.
Price, $1.50
MARINE REVIEW PUB. CO.,
Cleveland, O.

PROCTORS IN ADMIRALTY.

WILLIAM H. FAUST,
Lieutenant United States Navy, (ret.)
Counselor and Proctor in Admiralty.
Room 344 Federal Building,
BUFFALO, N. Y.

C. E. KREMER,
Counselor at Law and Proctor in Admiralty.
Suite 821-822 New York Life Bldg.,
CHICAGO, ILL.

HARVEY L. BROWN,
Proctor in Admiralty.
35 White Building, BUFFALO, N. Y.

HOYT, DUSTIN & KELLEY,
Lawyers and Proctors in Admiralty.
Offices, 702 Western Reserve Building,
CLEVELAND, O.

WHITE, JOHNSON, McCASLIN & CANNON,
Attorneys-at-Law and Proctors in Admiralty.
Williamson Bldg, CLEVELAND, O.

GOULDER, HOLDING & MASTEN,
Law Offices
H. D. Goulder S. H. Holding. F. S. Masten.
Perry Payne Building,
CLEVELAND, O.

ALBERT J. GILCHRIST,
Proctor in Admiralty.
604 Perry Payne Building,
CLEVELAND, O.

O. C Pinney. Dorr E. Warner.
PINNEY & WARNER,
Lawyers and Proctors in Admiralty.
Rooms 316 and 317 Perry Payne Bldg.,
Tel., Main 2585. CLEVELAND, O

HAND BOOK
OF
ADMIRALTY LAW,
by
ROBT M. HUGHES,
Price, $3.75
MARINE REVIEW PUB. CO,
Cleveland, O.

PROCTORS IN ADMIRALTY.

Geo. S. Potter. Meredith Potter.
POTTER & POTTER,
Lawyers and Proctors in Admiralty.
35-36 Dun Building, 110 Pearl Street,
BUFFALO, N. Y.

RAY G. MacDONALD,
Attorney-at-Law and
Proctor in Admiralty.
Suite 618 New York Life Building,
Telephone, Central 723. CHICAGO, ILL.

SHAW, WARREN, CADY & OAKES,
Attorneys-at-Law.
904 to 907 Union Trust Building,
Telephone, 625. DETROIT, MICH.

NAVAL ARCHITECTURE.
by
THOS. H. WATSON.

A manual on laying off iron and steel vessels. Valuable for naval architects as well as beginners in ship yards.

Price, $5.00

Order from
MARINE REVIEW PUB. CO.,
Cleveland, O.

PROFESSIONAL.

W. J. WOOD,
Naval Architect, Consulting Engineer.
Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.
Vessels designed—Twin S.S. Virginia, U.S.S. Frolic, formerly steam yacht Comanche, Twin S.S. North West and North Land, I. W. Nicholas and many others including Fire Boats, Tugs, Barges, etc.
Complete Plans furnished for Steel, Composite or Wooden Vessels.
709 Rialto Building, CHICAGO.
Tel. Harrison 1020.

HENRY RICE and
H. O. LOVEJOY,
Naval Architects.
Consulting Engineers.
Surveyors of Wood and Steel Ships, Engines and Boilers. Estimates of cost given. Superintendence of building and repairing. Plans and specifications furnished for all classes of ships.
Lines and models furnished.
Room 18,
202 Main Street., BUFFALO, N. Y.

JOSEPH KIDD,
Marine Architect and Surveyor.
Consulting Ship Builder and Engineer
Over thirty years' experience. Specifications, designs and estimates. Superintendence of construction and repairs. Damage and other surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.
610 Board of Trade,
DULUTH, MINN.

AMBROSE V. POWELL,
Member American Society Civil Engineers.
Civil Engineer.
Designs and Constructs Dry Docks, Harbor Works, Docks and Plant for Handling Coal and Ore, Foundations
Office 1008 Chamber of Commerce,
CHICAGO, ILL.

ROBERT W. HUNT & CO.,
Bureau of Inspection.
Tests and Consultation.
1121 The Rookery, CHICAGO.
Monong. Bank Bldg., PITTSBURG.
66 Broadway, NEW YORK.
Inspectors of shipbuilding material and machinery. Inspectors of all materials. Duty tests of engines and boilers. Physical and chemical laboratories.

PROFESSIONAL.

H. Matteson, Jr. Geo. B. Drake.
MATTESON & DRAKE,
Naval Architects and
Consulting Engineers.
Designing and Superintendence of building and repairing steel and wooden vessels.
Bulk oil vessels a specialty.
Agents for marine specialties.
706-707 Bourse, PHILADELPHIA.

ADAM STEEL, JAS. NACEY,
ALEXANDER HYND,
Marine Architects.
Mechanical Draughtsmen.
Consulting Engineers.
Specifications and designs for all descriptions of marine vessels, engines and boilers. Supervision of construction and repairs. Damage and other surveys carefully attended to.
208-9 Western Reserve Building,
CLEVELAND, O.
Phone, Main 3339 J.

PITTSBURGH TESTING LABORATORY, Ltd.,
Inspecting and Metallurgical Engineers and Chemists.
Inspectors of shipbuilding materials and machinery. Inspectors located at all mills. Physical and chemical laboratories. Tests of all kinds.
1750 Monadnock, CHICAGO.
235 Water Street, PITTSBURG.
906-7 Crozier Building, Philadelphia,
New York City, 60 New Street,
Richmond, Va., 1107½ Main Street.

Members Maritime Association Port of N. Y.
SADLER, PERKINS & FIELD,
Naval Architects and Engineers.
Chartering and Brokerage.
Maritime Bldg., New York.
NEW YORK. DETROIT.

NAVAL ARCHITECTS' AND ENGINEERS' DATA BOOK,
By T. H. WATSON.
Price, $1.50
MARINE REVIEW PUB. CO.,
Cleveland, O.

PATENTS.

E. L. Thurston. Albert H. Bates.
THURSTON & BATES,
Counselors at Law in Patent Causes, and Solicitors of Patents.
1028 Society for Savings Building,
CLEVELAND, O.

Buyers' Directory of the Marine Trade.

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review, 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Dake Engine Co.....Grand Haven, Mich.
Great Lakes Engineering Works.....Detroit.

AIR PORTS, DEAD LIGHTS, ETC.

Marine Mfg. & Supply Co.....New York.

AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.

ANCHORS.

Baldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Phosphor Bronze Smelting Co., Ltd...Philadelphia.
Victor Metals Co.....Braintree, Mass.

ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Sturtevant, B. F., & Co.....Boston.

ASBESTO-METALLIC PACKING.

American Steam Packing Co.....Boston.

ASH EJECTORS.

Great Lakes Engineering Works.....Detroit.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Brown, Harvey L.....Buffalo.
Faust, Lieut. Wm. H.....Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Pinney & Warner.....Cleveland.
Potter & Potter.....Buffalo
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon.....Cleveland.

BANKERS.

Fahey & Co.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Delauney, Belleville & Co.....St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. A. & Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Forest City Boiler Co.....Cleveland.
Gogebic Steam Boiler Works.....Duluth, Minn.

BOILER MANUFACTURERS.—Continued.

Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works.Oswego, N. Y.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water Tube Boiler Co.....New York.
Newport News Ship Building Co.Newport News, Va.
Northwestern Steam Boiler & Mfg. Co.Duluth, Minn.
Risdon Iron Works.....San Francisco.
Roberts Safety Water Tube Boiler Co...New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co.....New York.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

BOOKS, NAUTICAL AND ENGINEERING.

Marine Review Pub. Co.....Cleveland.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Lunkenheimer Co.....Cincinnati
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co.....Philadelphia.
Victor Metals Co.....Braintree, Mass.

BRIDGES, BUILDERS OF.

Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Brown Hoisting & Conveying Machine Co.Cleveland.
Macbeth Iron Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.
Marine Mfg. & Supply Co.....New York.

CARPETS, FURNITURE, BEDS, ETC.

Meckes, John.....Cleveland
Siegel, Cooper Co.....New York.
Sterling & Welch Co.....Cleveland.
Williams & Rodgers Co.....Cleveland.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co.....Jersey City, N. J.

CHAINS.

Lebanon Chain Works.....Lebanon, Pa.
Standard Chain Co.....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co.....Boston, Mass.
Dake Engine Co.....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co.....Cleveland.
Potter, J. D.....London.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.
Chelsea Clock Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.
Standard Gauge Mnfg. Co.....Syracuse, N. Y.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.

COAL AND ORE HANDLING MACHINERY.

Brown Hoisting Machinery Co (Inc.)....Cleveland.
Lidgerwood Mfg. Co.....New York.
Macbeth Iron Co.....Cleveland.

COMPASS ADJUSTERS.

Fields, Capt. J. M.....Cleveland.

COMPASSES.

Ritchie, E. S. & Sons.....Brookline, Mass.

CONCRETE MIXERS.

Contractors Supply & Equipment Co.....Chicago.

CONDENSERS.

Great Lakes Engineering Works.....Detroit.
Thropp & Sons Co., John E.....Trenton, N. J.

CONTRACTORS, SUPPLIES.

Contractors Supply & Equipment Co.....Chicago.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

CORDAGE.

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot.....Long Island City, N. Y.

COURSE FINDER.

Fields' Patent Course Finder.....Cleveland.

CHAIN CONVEYORS, HOISTS.

Brown Hoisting Machinery Co (Inc.).....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

CRANES, TRAVELING.

Brown Hoisting Machinery Co.....Cleveland.
Lidgerwood Mfg. Co.....New York.
Pawling & Harnischfeger.....Milwaukee.

DISTANCE FINDER.

Nicholson Ship Log Co.....Cleveland.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

DRYING APPARATUS.

Sturtevant, B. F. Co.....Boston.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

Buyers' Directory of the Marine Trade.—*Continued.*

ELECTRIC HOISTS AND CRANES.

General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Pawling & Harnischfeger.....Milwaukee.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Chase Machine Co. .....Cleveland.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros .....Philadelphia.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co.Newport News, Va.
Northwestern Steam Boiler & Mfg. Co.Duluth, Minn.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.
United States Ship Building Co.....New York.
Willard, Chas. P. & Co.....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
Marine Mfg. & Supply Co.....New York.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co.....Chicago.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Mooers & Co., H.....Milwaukee
New York Belting & Packing Co.....New York.
Northwestern Steam Boiler & Mfg. Co.Duluth, Minn.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander .....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph .....Duluth, Minn.
Lovejoy, H. O. .....Buffalo.
Matteson & Drake .....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell. Ambrose V.....Chicago.
Rice, Henry .....Buffalo.
Roelker, H. B.....New York.
Sadler, Perkins & Field .....New York.
Steel, Adam .....Cleveland.
Wood, W. J. .....Chicago.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert .....Buffalo.
Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland
Fore River Ship & Engine Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland

FLUE WELDING.

Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works .....New York.

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.
Smith, Stanley B., & Co.....Detroit.
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago.

GALLEY UTENSILS.

Meckes, John ..... Cleveland
Siegel Cooper Co.....New York.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.
Temple Pump Co..... Chicago.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co. .....Cincinnati.

GAUGES, WATER.

Bonner & Co., Wm. T..... Boston
Lunkenheimer Co ..... Cincinnati, O.
Standard Gauge Mnfg. Co..... Syracuse, N. Y.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

GROCERIES AND SUPPLIES.

Siegel Cooper Co.....New York.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co. (Inc.)....Cleveland.
Chase Machine Co.....Cleveland.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....New York.
Hyde Windlass Co.....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co .....Bay City.
Pawling & Harnischfeger.....Milwaukee.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Frankfort Marine, A. & P. G. Ins. Co....New York.
Gilchrist & Co., C. P.....Cleveland.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.

INSURANCE, MARINE.—Continued.

McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Peck, Chas. E. & W. F.....New York and Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Voss, F. D.....New York.
Weeks, F. H.....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P.....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. .....Pittsburg.
Carley Life Float Co.....New York.
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.

LIGHTS, SIDE AND SIGNAL.

Russell & Watson .....Buffalo.

LOGS.

Nicholson Ship Log Co.....Cleveland.
Walker & Sons, Thomas.....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co. .....Chicago.
Lunkenheimer Co. .....Cincinnati.

LUMBER.

Martin-Barriss Co .....Cleveland.
Shurick, F. S. .....New York.

MACHINISTS.

Chase Machine Co.....Cleveland.
Gogebic Steam Boiler Works.....Duluth, Minn.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Mooers & Co., H.....Milwaukee.
Union Machine & Boiler Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.
Meckes John..... Cleveland
Siegel Cooper Co.....New York.
Sterling & Welch Co. ..... Cleveland.
Williams & Rodgers Co., ...Cleveland.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works. ..... Detroit.
Sturtevant, B. F. Co.....Boston.

METALLIC PACKING.

Katzenstein, L. & Co.....New York.
U. S. Metallic Packing Co.....Philadelphia

METAL POLISH.

Bertram's Oil Polish Co.....Boston

MOTORS, GENERATORS—ELECTRIC.

General Electric Co.....Schenectady, N. Y
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Ritchie, E. S. & Sons..... .....Brookline, Mass

Buyers' Directory of the Marine Trade.—*Continued.*

NAVAL ARCHITECTS.

Hynd, Alexander .....Cleveland.
Kidd, Joseph .....Duluth, Minn.
Lovejoy, H. O. .....Buffalo.
Matteson & Drake .....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Sadler, Perkins & Field.....New York.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

OAKUM.

DeGrauw, Aymar & Co.....New York.
Stratford Oakum Co .....Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B.....Allegheny, Pa

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
Standard Oil Co.....Cleveland

PACKING.

American Steam Packing Co.....Boston.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Katzenstein, L. & Co.....New York.
New York Belting & Packing Co.....New York.
United States Metallic Packing Co....Philadelphia

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Detroit Varnish Co.....Detroit.
Detroit White Lead Works.....Detroit.
Forest City Paint and Varnish Co .... Cleveland.
New Jersey Zinc Co.....New York.
Sipe & Co., James B.....Allegheny, Pa.
Upson-Walton Co. .....Cleveland

PATENT ATTORNEYS.

Thurston & Bates .....Cleveland

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co .....Buffalo
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simon & Connell Co.....Chicago.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland.
Crane Co. .....Chicago.
Macbeth Iron Co. .....Cleveland

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co. .....Cleveland.
Otis Steel Co.....Cleveland.

PLUMBING, MARINE.

Sands, Alfred B. & Son.....New York

PNEUMATIC TOOLS.

Allen, John F.....New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co.....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.Newport News, Va.
Phosphor Bronze Smelting Co., Ltd.....Philadelphia.
Risdon Iron Works .....San Francisco.
Roelker, H. B.....New York.
Sheriffs Mfg. Co.....Milwaukee.
Superior Shipbuilding Co.....Superior, Wis.
Thropp & Sons Co., J. E.....Trenton, N. J.
Trout, H. G.....Buffalo.
United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

Bogue, Chas. J. .....New York.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks..Oswego, N. Y.
Temple Pump C..... ..Chicago.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York.

RANGES.

Russell & Watson .....Buffalo.
Siegel Cooper Co.....New York.

REFRIGERATING APPARATUS.

Great Lakes Engineering Works.....Detroit.
Roelker, H. B.....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping..New York.

REPAIRS—ENGINE AND BOILER.

(See also Boiler Manufacturers and Engine Builders.)

Gogebic Steam Boiler Works..... Duluth, Minn.
Marine Iron Co..... Duluth, Minn.
Forest City Boiler Co..... Cleveland.

RIVETING MACHINES.

Allen, John F.....New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland.

SAFETY VALVES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L.....Columbus, O.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

Bogue, Chas. J. ..... New York.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland.
Otis Steel Co. ..... Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co.Newport News, Va.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Shipowner's Dry Dock Co.....Chicago.
Smith & Son, Abram .....Algonac, Mich.
United States Ship Building Co.....New York.
Willard, Chas. P. & Co.....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.
Marine Mfg. & Supply Co..... New York.
Upson-Walton Co.....Cleveland.

SHIP LANTERNS AND LAMPS.

Russell & Watson .....Buffalo.

SHIP TIMBER.

Martin-Barriss Co. .....Cleveland.
Shurick, F. S.....New York.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co.....Jersey City, N. J.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR, SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co.....New York.
Gilchrist & Co., C. P.....Cleveland.
Holmes, Samuel .....New York.
McCarthy, T. R.....Montreal, Can.
Weeks, F. H.....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
International Mercantile Marine Co....Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line .....New York.

STEEL CASTINGS.

Macbeth Iron Co.....Cleveland.
Otis Steel Co..... Cleveland.
Seaboard Steel Casting Co.....Chester, Pa.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Marine Mfg. & Supply Co.....Cleveland.
Moulton Steering Engine Co.....New York.
Pawling & Harnischfeger .....Milwaukee.
Sheriffs Mfg. Co. .....Milwaukee.

STOCKS, BONDS, SECURITIES.

Fahey & Co.....Cleveland.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Hynd, Alexander .....Cleveland.
Lovejoy, H. O. .....Buffalo.
Matteson & Drake .....Philadelphia.
Nacey, James .....Cleveland.
Rice, Henry .....Buffalo.
Steel, Adam .....Cleveland.
Wood, W. J.....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co.....Chicago.
Pittsburg Testing Laboratory Ltd.....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. .....New York.
Watson-Stillman Co. .....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Sturtevant Co., B. F., Jamaica Plain.....Boston.

Buyers' Directory of the Marine Trade.—*Continued.*

TRUCKS.

Boston & Lockport Block Co.....Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co.....Pittsburg, Pa.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co.....Boston.
Ashton Valve Co .....Boston.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Mooers & Co., H.....Milwaukee.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co.....Troy, N. Y.

VARNISHES.

Detroit Varnish Co .....Detroit.
Detroit White Lead Works.....Detroit.
Forest City Paint & Varnish Co.. .....Cleveland
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co.....Boston.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co. .....Buffalo.
Elwell, Jas. W. & Co.....New York.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Gilchrist & Co., C. P.....Cleveland.
Hall & Root .....Buffalo.
Helm & Co., D. T.....Duluth.
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co. .....Cleveland.
McCarthy, T. R.....Montreal.
Mitchell & Co. .....Cleveland.
Prindiville & Co. .....Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks. F. H.....New York.

WATER GAUGES.

Bonner & Co., Wm. T .....Boston
Lunkenheimer Co.....Cincinnati, O.

VESSEL FURNISHINGS.

Meckes, John .....Cleveland
Siegel Cooper Co.....New York.
Sterling & Welch Co. .....Cleveland.
Williams & Rodgers Co., ...Cleveland.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co. .....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Lunkenheimer Co. .....Cincinnati.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Marine Mfg. & Supply Co .....New York.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co..Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co....New York.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Willard, Chas. P. & Co.....Chicago.

YAWLS.

Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW.

The star (*) indicates that the advertisement appears alternate weeks. The dagger (†) indicates that advertisement appears once a month. For addresses see advertisements on pages noted

VOL. XXIX. CLEVELAND, O., APRIL 14, 1904. No. 15

GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

ANTONIO C. PESSANO, Pres. and Gen. Mgr.

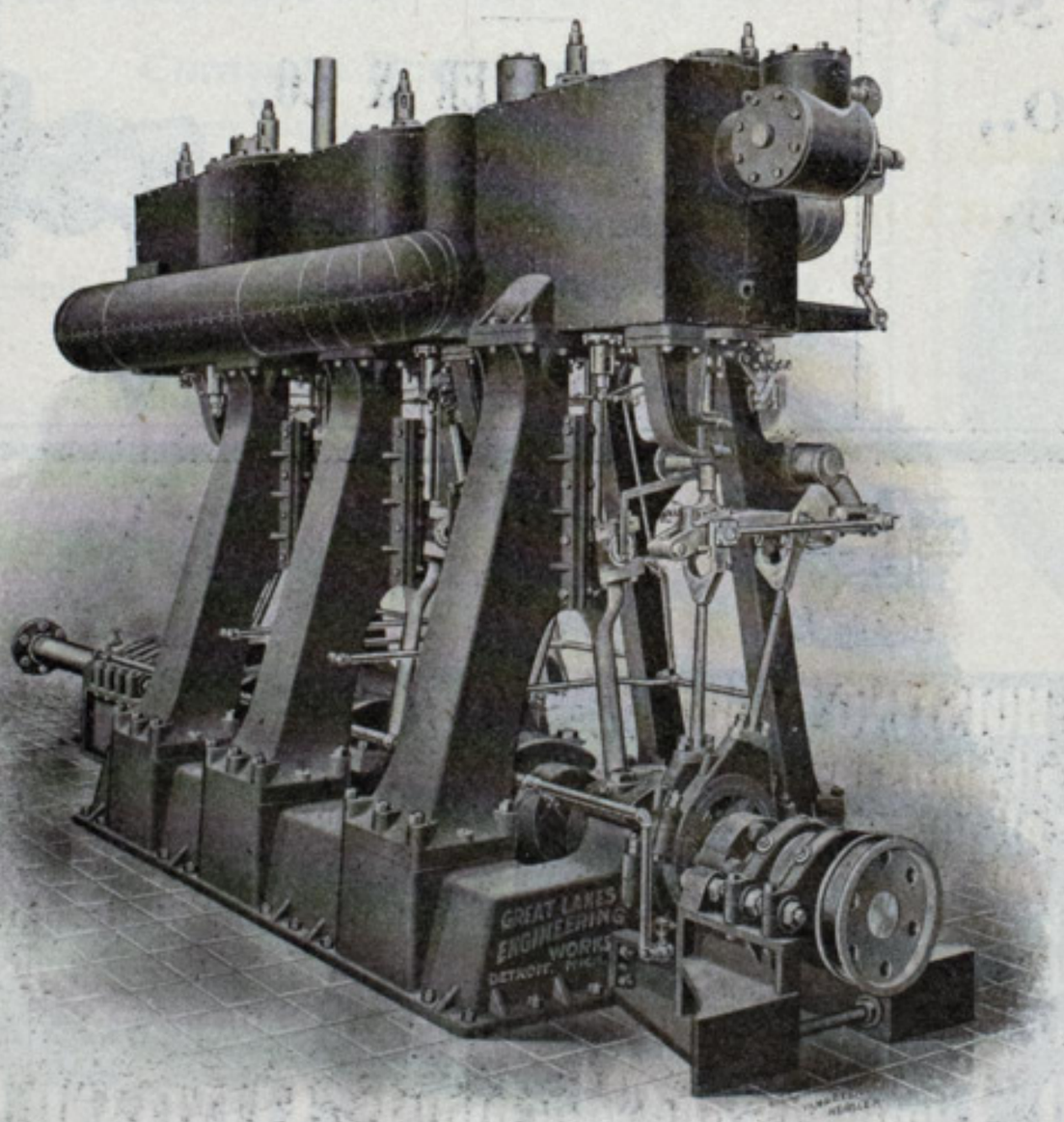
GEORGE H. RUSSEL,
Vice President.

JOHN R. RUSSEL,
Secretary-Treasurer.

Steel Ship Builders

Floating Dock

Marine Engines



Marine Repairs

Hydraulic Dredges

Hydro Carbon System

Propeller Wheels

U.S. AUTOMATIC INJECTOR

So carefully do we guard the reputation of the

U. S. Automatic Injector

that not a single one ever leaves the factory until it is thoroughly tested at different lifts and pressures.

Every injector that is sent out has its capacity marked on a tag attached to it. This capacity is fully guaranteed, but it can work at lower capacities more satisfactorily than any other injector made. It has proven more than once its ability to start at a lower pressure and work at higher pressure than any other injector.

We send our valuable "Engineer's Red Book" free to any engineer who will ask for it.

American Injector Co.,
Detroit, Mich.

Made in the United States — **Used the World over**

Practical Compass Adjustment

on

Iron, Composite and Wooden Vessels.

Compass Deviation,

Its Various Causes and Proper Cures.

With illustrations.

By Capt. W. J. Smith.

For helping those who have had little or no experience in actual Compass Adjustment.

Contents:

Excusable Negligence.
Obstacles.
Facts Connected with an Iron Ship and Her Compass.
Transient Induction.
Wooden Steamers.
On Magnets.
Preparatory Arrangements.
The Operation on the Standard Compass.
Retentive Magnetism.
Tracing Matters for Ship's Head East or West.
Heeling Error.
Description of the Marine Dipping Needle.
Absolute Necessity for Compass Adjustment.
Improper Use of Magnets.
Revising the Compass Record.
Adjusting by Distant Object.
Reciprocal Bearings.
Adjusting by One Magnet.
Transit Bearings.
Helpful Reminders.
Co-Efficients: Meaning of the Terms.
The Compass Deviascope.
Uncompensated Steering Compass.

Price, Postpaid, $2.

Order from

The Marine Review Pub. Co.,
39-41 Wade Bldg., Cleveland.

Steamships, Government, Revenue and Lighthouse Vessels, Yachts and Boats of all descriptions

Supplied with

FURNISHINGS

"From Steerage to Captain's Cabin."

Covering everything that can possibly be required in

Furniture,
Beds,
Carpets and Rugs,
Upholsteries,
Bedding,
Groceries,

Galley Ranges,
Galley Utensils,
Monogram and Crested Linens,
China and Glassware, etc.

Detailed work requfring special plans or sketches carried out by expert operators.

We gladly submit Estimates free of charge.

PROMPT DELIVERY OF GOODS.

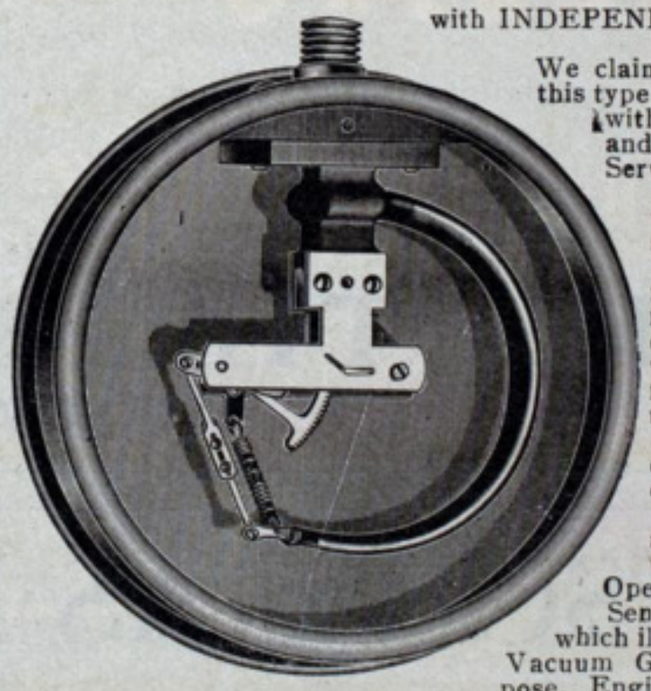
Address

CONTRACT DEPARTMENT,
SIEGEL COOPER CO.,
6th Ave., 18th and 19th Sts.,
NEW YORK CITY.

Please mention Marine Review, when writing.

"Standard" Self Contained Auxiliary Spring Gauge

with INDEPENDENT movement.



We claim particular merit for this type of gauge in connection with Marine, Locomotive and High Pressure Boiler Service, and they are guaranteed to give satisfaction under the most exacting requirements.

Material used by us in mechanism is selected for its superior wearing qualities and will outwear two gauges made from stock generally used.

Our gauges are provided with either Silvered, white enamel or black dials guaranteed accurate with U. S. Government Standard Open Mercury Column.

Send for Catalogue No. 17, which illustrates Pressure and Vacuum Gauges for every purpose, Engine Counters, Marine Clocks, Recording Gauges, etc.

MANUFACTURED BY

STANDARD GAUGE MFG. CO.,

Syracuse, N. Y.

BRANCHES:

141 Broadway, New York. 58 W. Washington St., Chicago.

PACIFIC COAST AGENTS:

Geo. H. Tay Company,
San Francisco and Los Angeles, Cal., Seattle, Wash.